

JOURNAL

OF THE

American Veterinary Medical Association

Formerly American Veterinary Review

(Original Official Organ U. S. Vet. Med. Ass'n)

PIERRE A. FISH, Editor

ITHACA, N. Y.

Committee on Journal

F. TORRANCE, *Chairman*, A. EICHORN, *Secretary*, C. J. MARSHALL, W. R. BLAIR, R. A. ARCHIBALD, M. JACOB, N. S. MAYO, G. R. WHITE, V. A. MOORE, L. FROTHINGHAM, C. H. STANGE, H. JENSEN, G. H. ROBERTS, R. P. LYMAN.

Sub-Committee on Journal

C. J. MARSHALL, *Chairman*, R. P. LYMAN, A. EICHORN, *Secretary*

The American Veterinary Medical Association is not responsible for views or statements published in the JOURNAL, outside of its own authorized actions.

VOL. XLIX. N. S. VOL. II.

JUNE, 1916.

No. 3.

Communications relating to membership and matters pertaining to the American Veterinary Medical Association itself should be addressed to Secretary C. M. Haring, University of California, Berkeley, California. Matters pertaining to the Journal should be sent to Ithaca, N. Y.

PREPARE FOR THE A. V. M. A. MEETING AT DETROIT

"Coming events cast their shadows before." We are already within the shadow of the next annual meeting of the American Veterinary Medical Association. It has been in the thoughts of the officers for some time and it is desirable that it should now be in the thoughts of the members as well. An instructive and profitable program is in process of arrangement; questions of paramount importance and interest to the profession are to be discussed; reports of value are to be presented and all worthy effort is to be made to make this the largest meeting yet held, both as to attendance and benefits received. All of this necessarily involves much thought and labor upon the officers and committees concerned. The members should now become interested at least to the extent of arranging their plans so that it will be possible for them to be in attendance. The leading motive in attending should be the interests of the profession and the important relationship the association bears in its efforts to advance these interests. A combined and massed effort should be strong enough to effect results.

The selection of Detroit as a meeting place has been a happy one. It is centrally located, when our brother practitioners in

Canada are considered, and is easy of access, by rail or boat. There is much in Detroit to appeal to visitors however diverse their callings. It may be of interest to veterinarians to know that it leads other cities in pharmaceutical manufacturing and is said to have the largest non-proprietary medicine manufactory in the world. It is famous for its park and boulevard systems; its educational system; its automobile production and the many delightful excursion routes on land and water that radiate in all directions with the city as a center. The citizens say that "life is worth living" in Detroit and the many natural and acquired advantages seem to confirm it.



ROAD ON BELLE ISLE

The local committee has worked faithfully and arduously to make this a banner meeting of the association. The governor of the state and the mayor of the city are announced to give addresses of welcome. The atmosphere has been charged with co-operation and generous hospitality is assured. The committee desires that early reservations should be made at the hotels in order that their work may be facilitated. Every effort is being made to make this a memorable occasion and to give the attendants a good time mentally as well as physically. Members should show their apprecia-

tion of this effort by their presence and that of their families. Entertainment will be provided for all.

Secretary Haring, in his efforts to obtain reduced rates for the meeting, sends us the following notice authorized by the Trunk Line Association for the territory which it covers—mostly in the east and middle west: "Two cents per mile in each direction, going and returning via same route only; tickets to be sold and good, going August 19 to 21, and returning to reach original starting point not later than August 29."



THE FORD AUTOMOBILE PLANT

At the present date, the local committee is able to announce the following program:

BUSINESS PROGRAM

MONDAY, AUGUST 21st, 10:30 A. M.—Assemble at Board of Commerce Auditorium.

State address of welcome—Gov. Woodbridge N. Ferris of Michigan.

Detroit address of welcome—Mayor Oscar Marx.

Response—By a prominent member.

Regular business—Evening, 8 P. M. Reception.

TUESDAY, AUGUST 22nd.—Reading and discussion of papers.

WEDNESDAY, AUGUST 23rd.—Sectional meetings—Reading and discussion of papers. 7 P. M. Banquet—Hotel Statler.

THURSDAY, AUGUST 24th, 8:30 A. M. to 6 P. M.—Entire day, the association will be guests of Parke, Davis & Co. Visit Laboratories and sail on Lake and River St. Clair. 7:30 P. M. Election of officers.

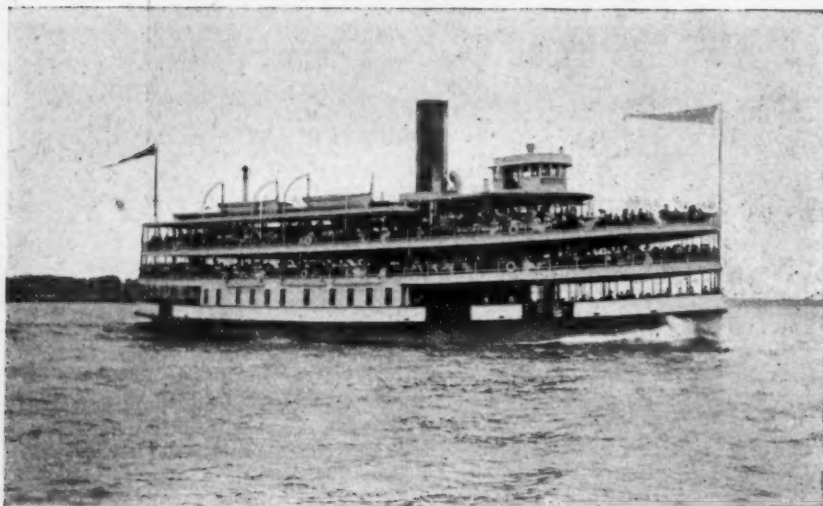
FRIDAY, AUGUST 25th.—Clinic, all day. The committee will endeavor to have on hand a number of interesting subjects. Installation of officers and adjournment.

ENTERTAINMENT PROGRAM

MONDAY—Monday afternoon—Visit through the shopping district for the ladies. 8 P. M.—General reception.

TUESDAY, 2:30 P. M.—Automobile ride for the ladies. Seeing Detroit. Tuesday evening—Card party for ladies.

WEDNESDAY.—2 P. M., Matinee Theatre party for ladies. 7:30 P. M.—Banquet. The committee is planning to have a splendid banquet within the means of all members.



STEAMER BRITANNIA

THURSDAY.—All day Thursday the members will be the guests of Parke, Davis & Co. At 9 A. M., the Steamer Britannia will convey the members to the company plant. Following a visit through the laboratories, the members and visitors will embark for a sail on Lake St. Clair through the famous Flats to River St. Clair.

Lunch will be served on board the steamer. The Britannia will return to Woodward Avenue by 6 P. M., allowing ample time for an evening session and election of officers.

THE DETROIT HOTELS

Among the more prominent and easily accessible hotels are the following:

STATLER (official headquarters): \$1.50 and \$2.00 per day for single room with shower bath; for two persons, \$3.00 per day.

\$2.50 to \$6.00 per day for room with tub and shower bath; for two persons, \$4 to \$8 per day. \$5 to \$12 per day for two connecting rooms, for two persons; for four persons, \$8 to \$12 per day. \$5 to \$12 per day for suites of parlor, bedroom and bath.

TULLER (one block away): \$1.50 and upwards. Add \$1.50 to price when two occupy room.

CHARLEVOIX (two blocks away): \$1.50 and upwards. Add \$1.00 when two occupy room.

GRISWOLD (two blocks away): \$1.50, \$2, \$2.50, \$3. \$2 and upwards for room with bath. Add \$1 when two occupy room.

HENRY CLAY (three blocks away): \$1.00 and up for single rooms. \$1.25 and up for single rooms with shower bath. \$1.50 and up for single rooms with tub.

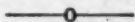
MADISON (three blocks away): \$1.00 and up for single rooms; \$1.50 for two persons. \$1.25 and up for single rooms with bath, \$2. for two persons. \$2.50 and up for two rooms with bath, for two persons.

CADILLAC (four blocks away): \$1.50 to \$5. Rooms with bath, 50 cents extra.

PONTCHARTRAIN (five blocks away): \$1.50 to \$2.50 for single room; \$3 to \$4 for double room. \$2.50 to \$5 for single room with bath; \$5 to \$8 for double room with bath.

STE. CLAIR (five blocks away): \$1 and up for single room. \$1.50 and up for room with bath.

METROPOLE (five blocks away. For men only): \$1 and up for single room. \$1.50 and up for room with bath.



HYPODERMAL ANAPHYLAXIS

Dr. S. Hadwen, of the Health of Animals Branch of the Department of Agriculture, Canada, has made an interesting discovery in connection with the research work on warbles he is engaged in at Agassiz, B. C.

Following the hint given by Ries in the *Receuil de Medicine Veterinaire Nos. 1 & 2, 1916*, regarding the effect of injecting an extract of crushed *Gastrophilus equi* larvae into horses, Hadwen has experimented in cattle by injecting *Hypoderma bovis*. The results are most surprising. Within five minutes the animal began to salivate, tears ran from its eyes, gaseous feces and clear mucus

were passed from the anus, there was rapid breathing, labored heart action, the skin turned purple and the animal held its head up. Urine was voided, a constant dribbling occurred and the animal coughed. Very soon the eyelids became swollen and the anus became edematous. The injection was made at 3:15 p. m., at 6 p. m. the animal was still distressed, but at 10 p. m. looked practically normal again. (The accompanying photographs are of this animal.)



No. 1—Anaphylaxis

Subsequent experiments confirmed this result. A steer injected with extract from eight larvae (4 *H. lineatum* and 4 *H. bovis*) at 3:15 p. m. showed symptoms at 3:30. He coughed, slobbered, his eyelids swelled until his eyes were barely visible. The body turned a purple color where the skin was white. Temperature at beginning 101, at 4:30, 99.6. Recovered.

A cow injected with eight *H. lineatum* larvae showed symptoms before the injection was completed. They were the same as previously described but developed more quickly. The body turned a livid purple color. The animal fell and died, all this in less than five minutes. A post-mortem was held but the results must be reserved for a further communication.

Experiment showed that the extract of larvae is non-toxic to small animals. Rabbits and guinea pigs were injected without ill effect.

A sheep was injected with an extract made from four larvae of *Oestrus ovis*. Before completing the injection, symptoms appeared, froth coming from the mouth. The sheep was allowed to rise; it then defecated and stood still with the nostrils wrinkled up and its



No. 2—Anaphylaxis—Note Edema of Anus

head drawn toward its shoulder. Breathing rapid and hard. Skin and mucous membranes a purplish color. The sheep staggered about, fell, got up, fell and died.

Further experiments are being conducted, but what has already been ascertained points to anaphylaxis as the explanation. Cattle harboring warble larvae become sensitized to them and when the system is suddenly flooded with the protein contained in the larvae (and possibly toxins) anaphylactic shock occurs.

F. T.

Dr. W. W. Williams, formerly of Batavia has located at Utica, N. Y.

EUROPEAN CHRONICLES

Bois, Jerome.

MELANOSIS. Among the many subjects of medicine and surgery, which attract the attention of the practitioner, melanosis is certainly one which ought to be ranked among the first.

Of course, for many it has an interest only from a surgical point of view. Whether a tumor, or an invasion, situated in any part of the body, the important question is whether it can be operated and what are the best chances for recovery. The sequelae are, many times, not taken into consideration. It may be on an animal of light color, white or grey, perhaps on rare occasions in dark coated individuals. It remains a surgical question.

There is, however, another question: that of the presence of melanosis within the body, in the muscles or any other part of the organism. The surgeon gives way to the sanitarian. The presence of melanotic deposits means very often the seizure of a carcass, more commonly in horses, but nevertheless also in cattle where it may also be found.

For these, the practitioner and the sanitarian, the presence of melanotic infection has therefore particular interest. But there is also another point of view, where melanosis deserves attention: the pathological, where in the examination of the various organs, the search is for its presence, the macroscopic lesions that it may give rise to, aid the microscopic changes that it produces. In all of these certain pathologists have not been indifferent and many are the writings that have been published on melanosis.

Prof. G. Petit of Alfort has been one of those who have worked on the subject and he has chosen the *Societe Centrale de Paris* as the place where his observations would do the most good and receive the best attention.

These observations were reproduced in several issues of the *Bulletins of the Societe*. They were illustrated and offered to the readers a most valuable stock of knowledge.

MELANOSIS OF BONES. If in post-mortems, the skeleton was the object of serious investigation, it is certain that melanosis of bones, recognized macroscopically, would not be considered any longer as a rarity. The blood transports in the marrow of bones, as everywhere else, not only melanine, but sarcomatous cells where they



No. 1.

MELANOTIC SARCOMA OF THE MYOCARDIUM AND ENDOCARDIUM (COW). Vertical section of the heart passing through the left ventricle.

Note the number and size of the tumors, as well as their various characters. Some are projecting in the cavity of the left ventricle, like enormous grapes of vegetating parietal endocarditis: some of which are pushing against the chordae tendinae: others are deeply inclosed in the cardiac muscle. Some are white, the others look like truffles. There are some which are a mixture of the two varieties.

M-M-M—True melanotic tumors, one in the inter-ventricular septum has some white patches.

S-S-S-S—White tumors of fasciculated sarcoma.

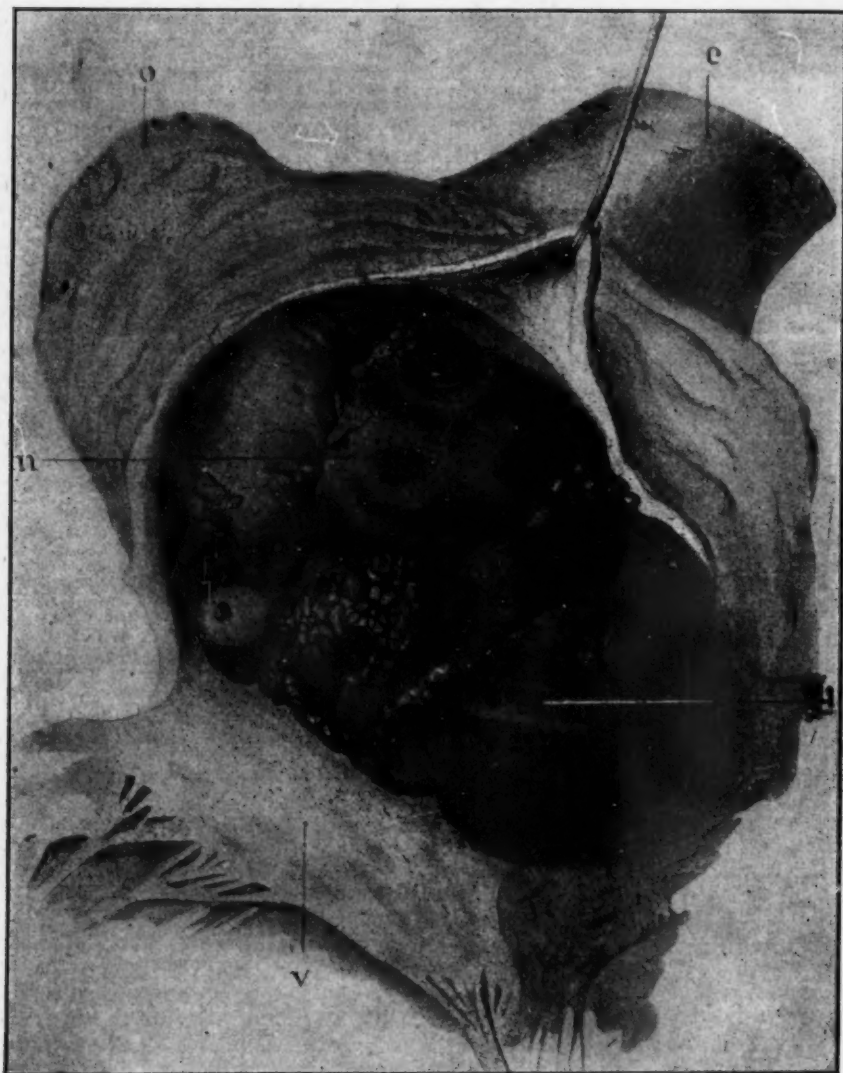
S—White tumor projecting on a melanoma.

C—Unfiltrated myocardium of the point of the heart.

D—Intraventricular septum, with both varieties of tumors.

V—Healthy mitral valve.

(Courtesy of Prof. Petit.)



No. 2.

ENORMOUS INTRA-AURICULAR MELANOMA (Horse.)

Auricles and veins are exceptionally filled with large melanomas, resembling gigantic coagulations and which naturally are united to the muscular structure from which they proceed.

C—Extremity of the right auricle, filled with a voluminous melanotic sarcoma (M. M.) lobulated and vegetating.

V—One of the valves of the tricuspid.

C—Dilated vena cava.

(Courtesy of Prof. Petit.)

proliferate and develop in their ordinary manner, though with a less destructive tendency than with ordinary sarcomatous metastasis.

It is not rare to observe in horses the presence of large melanotic tumors, sub-dorsal or sub-lumbar, which a rectal exploration can detect during life. These tumors spread through the foramina, enter the rachidian canal which they fill more or less, surrounding the nerve roots and pushing more or less against the dura mater. Sometimes it is the spinal cord which is surrounded by the tumor. How the progress takes place is well considered and the microscopic illustrations are very suggestive.

Costal melanosis is also spoken of among the bony lesions. The section of a rib is shown from its internal face, with the pleura covered with desseminated sarcomatous nodules of various size and thickness. Some being of marked black coloration, others grayish. A transverse section of the rib exhibits also the presence of the introduction of the melanosis into the marrow.

MUSCULAR MELANOSIS. The melanotic sarcomas of muscles, of the heart and of the blood vessels come next in the communication of Prof. Petit.

In their development, the muscular sarcomas behave as those of other regions, the intra-muscular generalization taking place by the blood, infrequently in horses. It is only a secondary localization. Indeed intra-muscular sarcomas have importance only from the public hygienic point of view and is under the jurisdiction of the sanitarian in case of the inspection of horse meat for food.

The secondary melanotic sarcomas of the heart is about as rare in animals as it is in man. It was, however, observed in horses first. Special attention is given to the mention of the lesions observed in a bovine, which by their peculiarity offers an interest because it elucidates the pathogeny of the melanotic sarcoma and its evolution and shows that after all, it is but an ordinary sarcoma, having the property of producing pigment, as have others in bones or cartilages. In that lesion, the melanotic infiltration and the development of the cells of the tumor take place in the heart muscular structure as it does in fasciculated muscles.

In relation to the blood vessel melanosis, Petit remarks that it is a very common occurrence in melanotic horses, on the course of the aorta and its divisions, melanotic nodules or infiltrations. A similar condition exists also with large veins such as the vena cava. What is more curious and rare is to find secondary nuclei in the

thickness of the aorta. In those cases, the tumor elements are brought by the vasa vasorum.

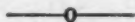
MELANOSIS OF CATTLE forms the subject of another communication. Melanosis of the skin is rare in cattle. Petit has seen it and studied its histology, which he illustrates.

PULMONARY MELANOSIS of cattle is sometimes observed as a pigmentation and not as a tumor development of the lungs, and without any other melanotic lesions present. Macroscopic sections through the lungs show sometimes that the infiltration takes place as if being disseminated in the depth of the organ. The histological study demonstrates that it is not a tumor but a progressive infiltration of the melanine through the alveolar septa. The pigment gathers around the bronchioles and arterioles.

The communication of Prof. Petit is continued by the record of a curious case of melanosis of the udder and the histology of palpebral melanosis.

This long series of valuable remarks on melanosis in general is followed by the description of a melanosis of the parotid gland, where almost half of the entire organ is involved.

While I cannot here follow the French professor, I present nevertheless two of the figures that illustrate the disease, one from the heart of one of the cattle, the other from a horse. I hope they will prove interesting to the readers of the *Journal*.



HEREDITARY RABIES. In a previous communication made in 1904-1908, Doctor Daniel Konradi has demonstrated that the infectious element of rabies was transmitted from the mother to the embryo. But the demonstrations were not accepted by all and other writers have ignored or denied them by experiments. In another communication Doct. Konradi reviews these objections and confirms by a series of experiments that there can be no longer any doubt of the correctness of the results and conclusions he has made in his previous writings.

The last series of experiments is published in the January number of the *Annales de l'Institut Pasteur*. There are points in the conclusions of this publication which interest all those for which rabies is an important question, from all points of view and with which physicians as well as veterinarians must be familiar.

The first part of the article in the *Annales* refutes the contradictory experiments and conclusions presented against the theory

of hereditary as demonstrated by Konradi and is followed by the presentation of several series of recent experiments.

Without entering into a complete analysis of each of the series, we can examine the conclusions given, merely referring the reader for more details to the number of the *Annales* where they appeared.

In the first series, the proof is made that in small animals, born 35 days after the inoculation of the mother and almost one year before she died with rabies the presence of the virus can be demonstrated by inoculation from the little ones.

It also shows that the virus taken from a human source, does lose some of its strength, after having been kept six days in carbolyzed glycerine.

With the second series, it was shown that the virus circulates, for a long time before death, in the blood of the mother and that it passes through the placenta and reaches the fetus. An important question to the practical point of view presents itself: for how long a time can the virus circulate in the blood of an animal affected with rabies before the characteristic symptoms appear and how long can the animal communicate the infection before his death? This question is asked because: "a dog had bitten another fourteen days before his death, and the last dog died with rabies thirty-nine days after he had been bitten."

The third series proved that a male animal infected with rabies and a female in the same condition may produce, 15 to 20 days before death, offspring in which experience has shown the existence of the virus. Hence a new question may be asked: was not the infection conceptional?

In the fourth series was a litter of six little dogs, born of a slut inoculated with the bulb from a rabid dog. They were born 63 days after the inoculation. The father was a healthy dog. These pups were separated immediately, and kept away from the mother, fed artificially and guarded against any possible chances of inoculation. At different dates, varying between 11 and 69 days they died and in all of them after their death with rabies, numerous corpuscles of Negri were found in their brains and the animals inoculated from them, died also with rabies.

After the description of these series, Konradi gives a table showing at a glance the synopsis of the experiments he has made where data of importance is given relating to the number of days for rabies to show itself in guinea pigs and rabbits when inoculated with the virus taken from the fetus.

For instance, it is shown that with guinea pigs the period varies between 11, 20, 22, 23 days and 92, 96, or even 98 days. With rabbits the disease appeared in one after 78 days, in three between 105, 159, 161, in two between 215 and 229 and finally in two between 475 and 725 days.

The article is summarized as follows: 1. The infectious germ of rabies is transmitted from the mother to the offspring, but in this process it becomes weaker and that is why rabies appears later, as the virus is further from its origin.

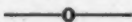
2. In this transmission, there does not seem to be any difference between the species of animals, as it takes place in dogs, rabbits, guinea pigs and probably also with other animals.

3. For these experiments and to obtain sure results of the inoculation, a rabbit must not be used, but guinea pigs and the injection must be made under the meninges. Guinea pigs being more sensitive to rabies, give more rapid and certain answers to the problem now under discussion. On the contrary, rabbits develop rabies very late and often not at all. This is a factor which has not been taken into account to this day and it is why those who experiment with rabbits only or other animals make erroneous conclusions.

4. It is also very important to continue the observation for a long time if the experiment is made with guinea pigs, because they contract also the disease much later than those that are inoculated with the virus of the mother.

5. The virus already circulates in the blood of the animal infected with rabies, when fever, which is the first symptom of experimental rabies makes its appearance in the beginning of the symptomatic period. With the blood it is transmitted from the mother to the fetus, weeks and even months before death.

6. The bite of a dog is dangerous fourteen days before the appearance of the clinical characteristic symptoms.



PALPEBRO-INTRADERMAL DIAGNOSIS. Although the brilliant application of this method to the diagnosis of tuberculosis and glanders is already widespread and has everywhere taken the place of the original classical method and of those that were advocated afterwards, it may not be without interest to refer occasionally to what others may still write of it.

Two of the professors of Toulouse have had the opportunity

to try on a very large scale the palpebro-intradermal tuberculation and have recorded their results in the *Revue Generale* where after giving the technic used, they examined the results and compared the value of the method and presented its advantages under two points of view.

On the professional side, they say: "no obligation of temperature taking; no chance of errors by too early or too late thermic reactions as these variations take place automatically; no necessity to operate at fixed hours; possibility of application in febrile subjects; possibility to make a great number of successive observations and no loss of time."

On the economical side, and for the owners of the animals, "less material disturbance; no immobilization of the farm hands; possibility of application to all the animals without exception in the stable or in pastures at any moment of the day; no, or very little, reduction in milk secretion; no danger of complication of mammitis; no increase of severity of the disease; less cost; possibility of the periodic and repeated tuberculation without excessive expense."

To summarize: 1. Palpebro-intradermal tuberculation has a diagnostic value at least equal to the classical method by subcutaneous injection.

2. It has a simple and quick application and the great advantage of suppressing the enormous labor of thermometrical notes and too frequent errors which occur with them.

3. For the future, it would be best to establish the diagnosis of tuberculosis in general ordinary practice by this method as a substitute for the subcutaneous which should be exclusively reserved for the control of doubtful results and be replaced by the palpebro-intradermal method.

These recommendations and various considerations are already well known to most veterinarians but younger practitioners may not realize the advantages herewith presented as they should, and these, after all, are for the benefit of all concerned.

A. LIAUTARD.

The next meeting of the Georgia State Veterinary Association will be held at Savannah, August 23rd and 24th. The officers are H. G. Cranes, president; J. W. Salter, vice-president; Peter F. Behaus, secretary-treasurer.

STUDIES IN INFECTIOUS ABORTION IN CATTLE*

WARD GILTNER, E. T. HALLMAN and L. H. COOLEGE

Department of Bacteriology, Pathology and Hygiene, M.A.C.
East Lansing, Mich.

PART I.

This laboratory has recognized the importance of research into bovine infectious abortion from the earliest date that this disease began to assume importance as a cattle pest of great economic significance. When Bang and Stribolt published their classic report on the etiology of the disease, C. E. Marshall, then head of this department, reviewed their work in a bulletin from this Experiment Station. Bang's work seems to have attracted little further consideration in this country for a considerable period. Even the unique and ingenious technique of the Danish investigator failed to attract its due attention among bacteriologists. At the Indianapolis meeting of this association in 1912, I had the pleasure of reporting on this subject and at that time reviewed briefly the principal contributions to the literature of the disease.

Our conception of the importance of bovine infectious abortion is shown by a quotation of a paragraph from my annual report to the director of the experiment station for this year, submitted to me by Dr. Hallman. "The problem of controlling contagious abortion is becoming a more and more important one each year. It is estimated by the Bureau of Animal Industry of the U. S. Dept. of Agriculture that this disease causes an annual loss of \$20,000,000 to the cattle industry of the United States. Assuming that the conditions are but average in Michigan, her share of this loss amounts to a little more than \$580,000 annually. We believe that the conditions in Michigan are more than the average. The small farms, small herds, and the policy of a number of farmers in a community to breed to a community bull are all conducive to the spread of the disease."

The successful control of abortion in cattle is not probable without a full scientific understanding of the nature of the causal microbe and the many phenomena of infection and immunity resulting from its interaction with the system of the bovine host. The

*Presented at the meeting of the A. V. M. A. Section on Sanitary Science and Police, Oakland, Cal., September, 1915.

use of chemical drugs has not given promise of success. We, at first, advocated a systematic dosing subcutem and per os with phenol in 2-5 per cent solutions. Others have advocated similar procedure and Taylor has even attempted an experimental explanation of the action of this chemical which had received the stamp of empirical approval many years back in Europe. We have abandoned its use as not hopeful and also not without danger when administered per os as a probable cause of intestinal paralysis. Our casual observations with methylen blue have been less encouraging. Dr. Hallman has undertaken experimental work with a view to determining the action, if any, of this drug.

In the field of biological therapeutics and prophylaxis, we have met with equally discouraging results. My first attempts at immunizing heifers with dead cultures were negative. It was demonstrated, however, that the introduction of such cultures resulted in the production of agglutinins and also exerted a pyrogenic action on the bovine body. I am of the opinion that if there is developed a true immunity to infectious abortion it will be of the nature of a phagocytic immunity and it should be our aim to prepare an antigen, the introduction of which into the body will stimulate the production of opsonins.

Along the line of diagnosis efforts we have given up the idea that, with our present knowledge of the gross and microscopic pathology of the disease, we can make a reliable diagnosis by an ordinary clinical examination of the aborting cow, aborted fetus or placental membranes. Many difficulties stand in the way of direct bacteriological examinations. I have devised an H tube which promises to be of assistance in furnishing a means whereby the peculiar oxygen requirements of the *Bact. abortus* may be satisfied. Medium for the *Bact. abortus* may be placed in one arm of the tube and some oxygen consuming chemical or a medium on which grows an aerobe is placed in the other arm. A communicating tube furnishes full opportunity for diffusion of the gases. The two arms of the tube are plugged with, first cotton, then rubber. We have also called attention to the value of amniotic fluid as a medium, either with or without agar, for *Bact. abortus*. Our results with the *abortin* test have been published. They indicate that this method has some value, but there is need of refinement of the *abortin*. It is well to call attention to the fact that the use of *abortin* and bacterial vaccines will materially interfere with the interpreta-

tion of blood serum reactions, a discussion of which will be found in Dr. Hallman's bulletin. Mr. Coolege emphasizes the value of milk serum reactions in diagnosis, a field that is very promising.

Finally I wish, again, to call your attention to the hopeful field of lactic acid therapy. We are still of the belief that naturally formed lactic acid by the action of *Bact. bulgaricus* or of ordinary lactic bacteria is the most efficient and at the same time least harmful antiseptic available in the treatment of aborting cattle. It is a question in our mind whether the *Bact. abortus* exerts a specific action in the ovaries or other essential procreative organs of the cow, in such a manner as to seriously interfere, temporarily or permanently, with conception. Certainly there is a great deal of sterility in cattle in herds affected with infectious abortion, and it is equally certain that much of this sterility is attributable to faulty methods of handling the aborting cow, especially the ones with retained afterbirth. The application of lactic acid therapy would obviate much of this trouble. [W. G.]

PART II.

In the spring of 1913 we started a project to compare the complement fixation test with the agglutination test, and to determine if possible, how long after abortion an animal might react to the tests. The herd selected was one in which abortion had existed for the past 7 or 8 years. Our plan was to make periodic tests at intervals of 3 or 4 months throughout a period of several years, recording the results obtained and tabulating the breeding data of each animal tested, not only for the period in which the test was made, but for several years prior to the time the work was undertaken. Unfortunately, we have been unable to carry out all the details of this plan, and the project has been abandoned in this particular case. However, we have a record of a few of the individuals in the herd and are presenting the data we have recorded.

The macroscopic agglutination test with dilutions of 1-100, 1-500 and 1-1000 has been used and .01, .02 and .04 c.c. respectively of the suspect's serum was used in the complement fixation test. A complete agglutination with a dilution of 1-100 was considered a positive reaction to the agglutination test and complete fixation of complement with .04 c.c. of suspect's serum was considered a positive reaction to the complement fixation test.

The following results were obtained: (See table I).

FIRST TEST:

Complement fixation test

26 reacted
14 suspicious
13 negative
—

53 total

Agglutination test

Records lost

SECOND TEST:

Complement fixation test

33 reacted
10 suspicious
—

43 total

Agglutination test

20 reacted
7 suspicious
16 negative
—

43 total

Of the 33 reactions to the C. F. test, 18 reacted to the Aggl. test
5 suspicious to Aggl. test
10 negative to the Aggl. test
—
33

Of the 10 suspicious to the C. F. test, 2 negative to the Aggl. test
2 suspicious to Aggl. test
6 negative to the Aggl. test
—
10

Of the 20 reactions to the Aggl. test, 18 reacted to the C. F. T.
2 suspicious to the C. F. T.
—
20

Of the 7 suspicious to the Aggl. test, 5 reacted to the C. F. T.
2 suspicious to the C. F. T.
—
7

Of the 16 negative to the Aggl. test, 10 reacted to the C. F. T.
6 suspicious to the C. F. T.
—
16

THIRD TEST:

Complement fixation test

20 reacted
7 suspicious
23 negative
—

50 total

Agglutination test

23 reacted
2 suspicious
23 negative
—

48 total

Of the 20 reactions to the C. F. test,	16 reacted to the Aggl. test 4 negative to the Aggl. test
	— 20
Of the 7 suspicious to the C. F. test,	4 reacted to the Aggl. test 3 negative to the Aggl. test
	— 7
Of the 23 negative to the C. F. test,	3 reacted to the Aggl. test 2 suspicious to Aggl. test 16 negative to the Aggl. test 2 not tested
	— 23
Of the 23 reactions to the Aggl. test,	16 reacted to the C. F. T. 4 suspicious to the C. F. T. 3 negative to the C. F. T.
	— 23
Of the 2 suspicious to the Aggl. test,	2 negative to the C. F. T.
Of the 23 negative to the Aggl. test,	4 reacted to the C. F. T. 3 suspicious to the C. F. T. 16 negative to the C. F. T.
	— 23

FOURTH TEST:

Complement fixation test

26 reacted to the C. F. T.
9 suspicious to the C. F. T.
11 negative to the C. F. T.

—
46 total

Of the 26 reactions to the C. F. test,

Of the 9 suspicious to the C. F. test,

Of the 11 negative to the C. F. test,

Of the 6 reactions to the Aggl. test,
Of the 10 suspicious to the Aggl. test,

Of the 27 negative to the Aggl. test,

Agglutination test

6 reacted
10 suspicious
27 negative

—
43 total

6 reacted to the Aggl. test
9 suspicious to Aggl. test
10 negative to the Aggl. test
1 not tested

—
26

1 suspicious to Aggl. test
7 negative to the Aggl. test
1 not tested

10 negative to the Aggl. test
1 not tested

—
11

6 reacted to the C. F. T.
9 reacted to the C. F. T.
1 suspicious to the C. F. T.

—
10

10 reacted to the C. F. T.
7 suspicious to the C. F. T.
10 negative to the C. F. T.

—
27

FIFTH TEST:

Complement fixation test

17 reacted
5 suspicious
24 negative

—
46 total

Of the 17 reactions to the C. F. test,

Of the 5 suspicious to the C. F. test,

Of the 24 negative to the C. F. test,

Of the 13 reactions to the Aggl. test,

Of the 9 suspicious to the Aggl. test,

Of the 24 negative to the Aggl. test,

Agglutination test

13 reacted
9 suspicious
24 negative

—
46 total

10 reacted to the Aggl. test
6 suspicious to Aggl. test
1 negative to the Aggl. test

—
17

1 reacted to the Aggl. test
3 suspicious to Aggl. test
1 negative to the Aggl. test

—
5

2 reacted to the Aggl. test
22 negative to the Aggl. test

—
24

10 reacted to the C. F. T.
1 suspicious to the C. F. T.
2 negative to the C. F. T.

—
13

6 reacted to the C. F. T.
3 suspicious to the C. F. T.

—
9

1 reacted to the C. F. T.
1 suspicious to the C. F. T.
22 negative to the C. F. T.

—
24

An endless amount of discussion and speculation might be based on these results. We only wish to state here that the margin of disagreement between the two tests is not so great as to utterly condemn either or both tests. It is evident that the complement fixation test will pick out more reactors than will the agglutination test but on the other hand, animals may react to the agglutination test and not to the complement fixation test. The opportunities for error in either test are great and we do not assume that our work has been conducted without error, but it may be safely assumed that it has been conducted as carefully as such work will be carried on in the future in routine examinations. In other words, it should give an indication of what may be expected of such work.

Some idea of the significance or lack of significance of these tests may be gained from an account of the history of a few individuals in the herd referred to.

No. 2. Aborted six years ago; has had five living calves since; reacted to first 3 Agglutination and C. F. tests. Not tested since.

No. 36. Aborted two years ago; has reacted to every test except 5th Complement Fixation Test; was suspicious to the 5th C. F. T.

Nos. 9, 19 and 26. Aborted two years ago; have reacted to every test except 4th agglutination; each was suspicious to that and No. 9 gave only suspicious reactions to the 5 agglutination test.

No. 16. Aborted two years ago; has reacted only to 2nd complement fixation test; suspicious to 2nd agglutination and 4th complement fixation tests.

No. 25 Aborted two years ago; suspicious reaction to 2nd agglutination and 2nd complement fixation tests.

No. 33. Aborted two years ago; suspicious to 2nd and 4th complement fixation tests.

No. 37. Aborted two years ago; sterile since; suspicious reaction to 2nd complement fixation test; reacted to 4th complement fixation test.

Nos. 7, 28 and 35. Aborted one year ago; have reacted to every test since except that No. 35 was negative to the 2nd agglutination test, and No. 7 suspicious to 3rd complement fixation test.

No. 30. Aborted one year ago; suspicious to 2nd and 4th complement fixation test; reacted to 2nd agglutination test.

No. 39. Aborted 1, 2, 3, 4 and 5 years ago, respectively; has reacted to every test except 4th and 5th agglutination tests; suspicious to those.

Nos. 47 and 52. Have never aborted; have reacted to every test except that No. 52 was negative to the 4th agglutination test and suspicious to the 5th agglutination test.

About eighteen months before this project was started, Dr. Giltner tested this herd with abortin. There is very little reason to believe that the effects of the abortin injections remained at the time of the serum tests. A remarkable thing about these tests is exemplified in Nos. 2, 47 and 52, cows that are apparently able to deliver a healthy calf every year, in spite of a strong reaction to two serum tests, that indicate infection in these cases. It would be interesting to know just what relation the abortus bacterium

bears to these cases. With reference to No. 2, is it possible that antibodies resulting from an infection over five years since, could persist all these years, or is she a germ carrier? From the standpoint of sanitary control, should such cows be isolated and quarantined, and should their owners be refused permission to place them on the market for sale?

The use of living cultures of the abortus bacterium on open females and dead cultures on pregnant females, has been applied to a few herds with the object of observing their pyrogenic and immunizing effects.

Not a large enough number of animals have been under observation to make any valuable deductions, nor has any herd been treated with a part of the herd left as controls. It has been difficult to get owners to agree to have a part of their herd untreated, and difficult to get them to record temperatures for several days after the injections.

The method of treatment adopted was to cultivate the organisms on neutral agar until considerable growth had occurred; these were then washed off with sterile salt solution, and diluted so that there were approximately 4 to 5 billion organisms per c.c. Where dead cultures were used the suspension was heated to a temperature of 60°C. for one hour and transfers made to agar to determine their sterility. Where the living cultures were used, they were injected within a few days from the time the dilutions were made.

There is little in our work to encourage one in the use of dead cultures, and there is reason to believe that injury may result in some cases from the use of living cultures. Nothing but an extensive series of carefully conducted experiments will demonstrate the actions of these injections.

In one herd we have recorded the following observations: Of 19 animals receiving living cultures at the 1st injection, 4 gave a marked thermal reaction; 11 gave a slight thermal reaction and 4 gave no thermal reaction. (See Table III.)

Of the 17 animals receiving dead cultures, 7 gave a slight thermal reaction, and 10 gave no thermal reaction. (See Table V.)

Of 15 animals not reacting to the test and receiving injections of living cultures, 9 having calved normally only after experiencing considerable difficulty in getting them with calf; 3 have aborted; 1 has been sold without learning subsequent history and 2 are sterile. Of 2 animals reacting to the test and one suspicious and not tested, all calved normally. (See Table II.)

Of 10 pregnant animals reacting to the test and receiving injections of dead cultures, 4 have aborted (also probably No. 39), 4 have calved normally, and 1 died on the 228th day of gestation with a normally developed calf in utero.

Of 6 animals not reacting to the test, and receiving dead cultures of the abortus bacterium, 3 have calved normally and 3 have aborted. One giving a suspicious reaction to the test, calved normally. (See Table IV.)

At the time the herd was tested we were not in a position to make the complement fixation test and the reactions recorded were the result of agglutination tests made between November 21, 1912 and December 4, 1912. It is significant that Nos. 9, 18 and 20, (Table IV), aborted, although they failed to react to the test several months after breeding.

It will be observed in Table II that considerable difficulty was experienced in breeding a number of the heifers treated with living cultures. When this method is carried out we believe it highly desirable that breeding be deferred for at least 3-4 months after the last injection. In this same herd the same trouble in breeding animals subsequent to calving or aborting, after injections of dead cultures, was experienced. This trouble cannot be attributed to the herd bull as there were two bulls in the herd, both of which had before and since proven their potency. It would be interesting to know what relation there was between these injections and sterility.

In another herd of 21 animals, in which there were 14 abortions out of 20 of breeding age, during the summer, fall, winter and spring respectively of 1912-13 and in which no abortion had ever occurred before, we have recorded the data presented in Table VI.

—[E. T. H.]

TABLE I.

Comparison of the Complement Fixation with the Agglutination Tests for Contagious Abortion in Cattle.

[illegible]

TABLE II.
Non-pregnant Animals Receiving Two Injections

No.	Date of Birth	Previous History	Reaction to Test	Date of First Treatment	Amount Injected	Date of Second Treatment	Amount Injected
1	9-4-11	Bred but did not conceive 11-18-13	+	12-14-12	10 c.c.	12-28-12	20 c.c.
3	12-15-10	Calved 9-27-12 Calf died on 4th day with white scours	+	"	"	"	"
5	9-14-05	Last calf 4-2-12	—	"	"	"	"
11	4-10-11	Bred but did not conceive 11-3-12	—	"	"	"	"
13	2-7-12		—	"	"	"	"
14	12-15-10	Calved 7-20-12	—	"	"	"	"
15	2-1-11	Calved 10-9-12	—	"	"	"	"
16	10-23-08	Last calf 10-19-12	—	"	"	"	"
19	8-30-10	Calved 7-20-12	—	"	"	"	"
23	1907	Last calf 9-9-12	S	"	"	"	"
24	1908	Aborted (?)	No Test	"	"	"	"
25	1906	Last calf 11-8-12	—	"	"	"	"
27	7-12-11		—	"	"	"	"
28	5-4-11		—	"	"	"	"
29	5-4-11		—	"	"	"	"
30	5-29-11		—	"	"	"	"
31	7-18-11		—	"	"	"	"
32	7-18-11		—	"	"	"	"
33	7-1-11		—	"	"	"	"

TABLE II (*Continued*)

of Living Organisms at Intervals of Two Weeks.

Dates of Breeding	Subsequent History
1-22-13 3-18-13 2-8-13 6-19-13 2-27-13	Calved 3-27-14
4-14-13	Calved 1-24-14
1-24-13 9-1-13 4-14-13 10-21-13	Calved 8-3-14
Bred 12-28-12. Came in heat 3-24-13 and was bred	Calved living calf 10-10-13 from Dec. service.
7-22-13 8-13-13	Calved 5-26-14
1-10-13 2-24-13 2-2-13 3-17-13	Calved 12-26-13
1-29-13 4-28-13 2-18-13 3-10-13 6-24-13	Sold
1-2-13 3-20-13 6-14-13 1-28-13 4-10-13 7-8-13 2-18-13 5-12-13 8-28-13	Aborted 4-29-14 on the 281st d. Calf lived until 5-8-14.
12-21-12	Calved 10-22-13
5-4-13 5-28-13	Calved 3-14-14
4-29-13 6-19-13	Calved 3-28-14
	In heat again 11-27-13. No evidence of abortion had been observed. Animal sold since.
4-14-13 5-7-13	
1-28-13 12-10-13 3-25-13 1-1-14 9-14-13 1-20-14	Calved
2-14-13	Calved 11-20-13
	Sold but learned later that animal calved at full time.
1-7-13 3-5-13 2-3-13 1-6-13 3-25-13 1-11-13 5-11-13 1-31-13	Gave birth to a mature calf 11-5-13
3-9-13 7-22-13 6-9-13 8-12-13	Calved 5-20-14
	Aborted 6-7-13
12-24-13	
1-30-13 5-14-13 11-11-13 3-2-13 7-8-13 12-10-13 3-27-13 9-9-13 1-1-14 1-5-14 2-22-14 4-13-14 7-10-14	

TABLE III.

Temperatures of Non-pregnant Animals Receiving Two Injections of Living Organisms.

1st injection given between 9 a. m. and 2 p. m., 12-14-12									2nd injection given be- tween 2 p. m. and 4 p. m., 12-28-12			
No.	12-14-12	12-15-12			12-16-12		12-17-12	12-18-12	12-28-12	12-29-12		12-30-12
	7 p. m.	9 a. m.	2 p. m.	7 p. m.	9 a. m.	7 p. m.	7 p. m.	6 p. m.	6 p. m.	11 a. m.	6 p. m.	3 p. m.
1.	103.6	103.9	102.	101.6	101.6	104.6	104.	102.2	102.1 102.8	101.2 101.8	102.3 101.	102.
3.	102.1	103.6	103.2	101.1	102.1	102.1	103.8	101.				
5.	100.9	105.4	104.6	104.2	101.4	104.8	102.8	101.2				
11.	101.5	103.4	103.4	102.5	103.4	104.4	101.3	102.8				
13.	104.4	102.3	103.4	102.5	103.4	104.4	101.	102.				
14.	100.1	104.	103.2	101.8	103.5	104.4	103.9	100.8				
15.	101.6	103.3	103.3	102.1	101.8	104.3	104.2	101.				
16.	101.8	102.	101.4	101.	101.4	101.2						
19.	100.1	104.	104.4	102.9	103.9	102.4	101.6	101.2				
23.	102.8	101.1	101.1	101.6	100.8	102.	102.					
24.	101.8	103.9	103.6	102.5	102.2	102.3	101.8					
25.	101.1	102.	102.4	101.8	101.6	103.4	102.8					
27.	100.7	103.9	104.3	102.1	104.	104.3	101.7	102.7				
28.	101.2	101.4	101.8	101.3	104.3	104.4	103.	102.3				
29.	102.4	105.9	105.7	106.5	101.7	103.6	103.2	102.6				
30.	100.7	102.7	102.6	101.5	104.	101.9	100.	101.6				
31.	102.2	102.8	104.1	103.7	103.7	103.8	104.5	103.				
32.	100.2	105.5	105.6	106.3	106.6	105.2	104.5	102.1				
33.	103.	105.	105.4	106.5	104.8	104.5	104.2	102.8				

TABLE V.

Temperatures of Pregnant Animals Receiving Injections of Dead Organisms.

No.	1st injection given between 1 and 2 P. M., 12-14-12							
	12-14-12	12-15-12			12-16-12		12-17-12	12-18-12
	7 p. m.	9 a. m.	2 p. m.	7 p. m.	9 a. m.	7 p. m.	7 p. m.	6 p. m.
2	102.9	102.2	102.1	101.5	101.6	102.8	102.	102.
4	102.1	103.4	102.	101.2	101.	100.8		
6	101.3	101.4	102.	101.5	101.6	100.4		100.2
8	101.2	101.4	101.8	101.2	101.4	101.7		
9	103.8	101.4	101.4	101.5	101.5	102.4	102.4	
17	100.1	101.5	101.5	101.4	100.8	101.3		
18	101.7	101.1	101.4	101.7	101.6	101.		
20	101.2	101.7	101.2	101.6	101.6	101.		
21	100.1	102.1	101.5	101.6	100.7	101.		
26	101.8	102.8	102.8	100.8	101.2	103.	99.8	100.6
38	102.2	101.5	101.4	100.8	101.2	103.		
39	101.3	104.4	104.	101.8	101.3	102.6	103.8	100.6
40	101.4	104.	101.	101.4	101.	102.	101.	100.8
43	101.6	101.9	101.8	101.6	101.4	101.		101.2
45	104.3	102.8	102.	101.4	101.8	102.8	102.2	101.2
47	101.9	101.1	101.6	102.	101.4	101.4		101.8
48	101.3	101.6	101.6	101.6	101.	101.4		101.4

TABLE IV.

Pregnant Animals Receiving Two Injections of Dead Cultures of *Abortus Bacillus* at intervals of Two Weeks.

No.	Date of Birth	Previous History	Reaction to Test	Date of Breeding	Date of First Treatment	Amount Injected	Date of Second Treatment	Amount Injected	Subsequent History
2	12-15-10	Heifer	+	6-4-12	12-14-12	10 c.c.	12-28-12	20 c.c.	Aborted living calf, 2-20-13 on the 256th day
4	5-20-10	Aborted about 180th day in Dec., 1911	+	7-18-12	12-14-12	10 c.c.	12-28-12	20 c.c.	Calved normally, 4-24-13
6	3-10-07	Calved normally	-	10-22-12	12-14-12	10 c.c.	12-28-12	20 c.c.	Calved normally, 7-26-13
8	4-18-11	Heifer	-	10-28-12	"	"	"	"	Calved normally, 8-5-13
9	3-6-11	Heifer	-	6-30-12	"	"	"	"	Aborted Jan. 20-13, on the 200th day
21	1907	Calved normally	+	10-20-12	"	"	"	"	Calved normally, August 2-13
26	3-4-05	Calved normally	+	7-18-12	"	"	"	"	Calved normally, 6-4-13 (?)
17	4-6-06	Calved normally	-	(?)	"	"	"	"	Calved an apparently normal calf, 4-18-13
18	11-5-09	Calved normally	-	7-6-12	"	"	"	"	Aborted, 3-28-13, on the 262nd day
20	1-4-06	Calved normally	-	8-10-12	"	"	"	"	Aborted 2-28-13, on the 198th day
38	9-8-08	Calved normally	+	11-12-12	"	"	"	"	Aborted 6-30-13, on the 228th day
39	1-13-06	Calved normally	+	7-12-12	"	"	"	"	Animal did not conceive. Has been bred several times since without results.
40	12-7-05	Calved normally	+	7-21-12	"	"	"	"	Aborted 3-10-13, on the 229th day
43	6-14-04	Calved normally	+	7-28-12	"	"	"	"	Cow died suddenly, 3-16-13. Normal developed calf in uterus at death
45	(?)	Calved normally	+	8-22-12	"	"	"	"	Aborted, 1-30-13, on the 158th day
47	2-1-11	Heifer	+	5-20-12	"	"	"	"	Calved normally, 3-3-13
48	5-11-08	Calved normally	S	(?)	"	"	"	"	Calved normally, 4-13-13

TABLE VI.

No.	Age	PREVIOUS HISTORY	Reaction	Date of 1st Treatment	Material Injected	Date of 2nd Treatment
1	3	Aborted 11-4-12	+	2-22-13	Dead Cultures 10 c.c	3-14-13
2			+	"	"	"
3		Aborted 12-4-12	+	"	"	"
4		Aborted 12-8-12	+	"	"	"
5		Calved normally 10-22-12	+	"	"	"
6	13	Now in calf (2-22-13)	—	"	"	"
7			+	"	"	"
8			—	"	"	"
9		Heifer not bred yet	+	"	"	"
10	7	Aborted 2-4-13	+	"	"	"
12	6	Aborted 8-25-12	+	"	"	"
13	7	Calved normally 2-6-13	—	"	"	"
14		Calved normally 8-17-12	+	"	"	"
15	6	Aborted 10-3-12	+	"	"	"
16	4	Aborted 2-12-13	+	"	"	"
17	2	Aborted 8-21-12	+	"	"	"
18	4	Aborted 10-2-12	+	"	"	"
19	3	Aborted 11-10-12	+	"	"	"
20	2	Aborted 10-18-12	+	"	"	"
21	2	Aborted 2-11-13	+	"	"	"
22		Aborted 3-1-13	+	"	"	"

TABLE VI—Continued

Material injected	Date of Breeding		Subsequent History
Dead cultures 20 c.e.	2-16-13	3-9-13	Calved normally 2-12-14
"	5-12-13		Aborted 4-12-13
"	5-14-13		Aborted 12-16-13
"	2-24-13	3-16-13	Bred several times since without re-
"	7-25-13	5-20-13	sults. Sold for beef 8-19-14
"	4-27-13		Delivered a dead calf 1-26-14 on the 269th day of gestation.
Not treated			Calved normally 3-16-13
Dead cultures 20 c.e.			Calved normally 4-11-13
"			Calved normally 10-2-13
Living cultures 10 c.e.	6-8-13		Calved normally 3-12-14
"	5-22-13	7-2-13	Calved normally 4-7-14
Dead cultures 20 c.e.	1-5-13	2-8-13	Aborted 7-8-13
"	6-26-13		Calved normally 4-12-14
"	2-16-13	3-5-13	Came in heat almost regularly and
"	7-4-13	5-7-13	served nearly every time up to 8-17-14
"	2-26-13	3-14-13	Delivered a weak calf on the 288th day
"	4-17-13	5-11-13	of gestation. Calf died at 24 hrs. old
Living cultures 10 c.e.	6-7-13		
"	7-13-13		Calved normally 4-16-14
"	2-22-13	3-14-13	Calved 12-7-13, 33 days earlier. Calf
"	4-3-13		is alive and doing fine 15 months later.
"	2-17-13	3-11-13	Delivered an apparently mature and strong calf 11-12-13. Evidently con-
"			ception occurred at 1st service.
"	2-14-13	3-7-13	Delivered an apparently mature and strong calf 11-12-13. Evidently con-
"	2-15-13	3-7-13	ception occurred at 1st service.
"	3-29-13	4-19-13	
"	5-13-13		Aborted 12-1-13
"	6-2-13		Calved normally 3-1-14
"	6-11-13		Calved normally 3-19-14

PART III.

Recent investigations of Schroeder and Cotton show that the organism causing contagious abortion is frequently expelled from the bodies of apparently perfectly healthy cattle with their milk. Bang, Nowak, M'Fadyean and Stockman, McNeal and Kerr, Good, Giltner, Hallman and others have shown that a pure culture of the organism may cause abortion in the following animals: cattle, sheep, swine, goats, mares, guinea pigs and rats. Melvin suggests that this bacterium may prove pathogenic for human beings. It seems quite probable that if this organism is present in cow's milk, which is the only food of many infants, it may bring about disease. There is the possibility that its presence in milk may, in part, account for the high mortality of bottle-fed babies. In view of these possibilities it seems important that a further study of the presence of this organism in milk be made.

In making a study of the presence of *Bact. abortus* in milk there are two methods of procedure available. The cultural method of isolating *Bact. abortus* directly from the milk sediment cannot be depended upon owing to the difficulty of growing the organism on artificial media. This difficulty of growing the organisms by direct inoculations from infected material is due in part to the fact that it acts in a peculiar manner towards oxygen. It will not grow aerobically or anaerobically, but requires an atmosphere partially depleted of oxygen. A number of methods of growing the organisms have been tried by different investigators with but partial success. The most promising cultural method is the growth of the organism in a closed jar with a culture of *B. subtilis*. *B. subtilis* gradually uses up the oxygen and for a period conditions are suitable for the growth of the abortion organisms.

The unusual relation of this organism toward oxygen is shown in agar shakes of a pure culture. The growth then occurs in a sharp zone where the oxygen tension is found to be most suitable. This zone is usually about one-half centimeter below the surface. This organism becomes aerobic after a few generations growth.

The other method of study, the inoculation of guinea pigs with milk, while more reliable, is far from satisfactory, owing to the fact that it requires from 8 to 10 weeks for the lesions to develop and it is probable that the organism must be present in large numbers to cause the disease with the 5 c.c. of milk used for inoculation.

In studying milk from cows affected with contagious abortion

it was thought that possibly the blood serum tests as used in the study of the disease in cattle and horses might be applied, using milk to replace the blood serum. So far, the complement fixation test has given negative results but further work is to be done with it. Work with the opsonic index, while encouraging, has not been carried far. Work with the agglutination test has given encouraging results and it is the object of this paper to tell of experiments upon the application of this test to the milk of cows affected with contagious abortion or in herds where the disease has existed.

The agglutination test used in this work is an application of the serum test used in the study of infectious abortion in cattle. A polyvalent strain of *Bact. abortus* is used for antigen. Fresh milk to be studied is used to replace the blood serum. Dilutions are made as follows 1:50, 1:100, 1:200, 1:500 and 1:1,000. Tests are usually made within 30 minutes of the time the milk is drawn. Cellular counts are made upon all samples. Samples of milk are collected a little before the middle of the milking. It was found that cloudiness caused by using the whole milk did not interfere with the observation of agglutination in the dilutions used.

Milk studied was obtained from a herd having a record of a number of abortions and in which the blood serum of a high percentage of the animals gave positive complement fixation and agglutination tests.

The milk from each quarter of 61 cows has been examined at intervals during the past 10 months. Of these the milk of 18 cows (30%) has given a positive agglutination test in one or more quarters at some time during this period.

Tests have been made upon all milk giving a positive reaction at intervals of 1 to 3 weeks. Milk giving a negative reaction has been examined at intervals of 3 to 6 weeks.

In this way the power of the milk of one quarter to agglutinate the abortion bacterium has been observed to spread to another quarter and finally to all four; it has also been observed to gradually die out. In some cases the milk of all four quarters has retained a strong agglutinating power during the 10 months. In other cases one lone quarter has remained positive during that period.

A comparison of the bacterial count, cell count and original acidity with the agglutination reaction of milk from 7 cows having 12 positive quarters and 16 negative quarters shows a much lower average bacterial count, and cell count, and a slightly lower original

acidity, in the agglutinating quarters. These factors, however, apparently have no significance as a positive milk in one case may have a very high bacterial count and cell count and in another case have very low counts.

One of the first and most important questions that arises in connection with this work is: Is a positive agglutination test due to a local production of agglutinins caused by the presence of *Bact. abortus* in the quarter, or are the agglutinins transmitted to the milk from the blood? In connection with this question an attempt is being made to demonstrate the presence of *Bact. abortus* in samples of milk that agglutinate the abortion bacterium. This work while incomplete has resulted as follows: Out of 18 quarters, the milk of which agglutinates the abortion bacterium, the milk of 14 produce lesions in guinea pigs which are like the typical lesions caused by a pure culture of *Bact. abortus*.

Tests of the power of different portions of an agglutinating milk, to agglutinate the abortion bacterium show that milk drawn about the middle of the milking has the strongest agglutinating reaction. The strippings of a positive milk in nearly every case have a decreased agglutinating power and in many cases are negative.

The fact that in a sample of milk which agglutinates *Bact. abortus*, the first half, or that portion of the milk which stands in the milk cistern, gives a strong reaction, while the last half or that portion which is secreted during the milking process gives a much weaker or even a negative reaction, points to a local production of agglutinins rather than to their coming from the blood stream.

In the 7 cows whose milk has gradually acquired the power of agglutinating the abortion bacterium during this experiment one or both of the rear quarters have been the first to show agglutination. An exception is a case in which a rear quarter and a front quarter showed their first agglutinations at the same time. If we take it for granted that a positive agglutination test points to the presence of *Bact. abortus* in the quarter this would bear out William's theory that the greatest source of infection of the udder is through genital discharges gaining the orifice of the teat by means of running down the sides of the udder or by switching of the tail. According to this theory the rear quarters would be more liable to infection than the front quarters. From the rear quarters then, the infection might easily be transferred to the front quarters by the hands during the milking.

The history of a cow whose milk had never agglutinated *Bact. abortus* is as follows:

Cow Light. This cow has had a record of several abortions and her blood has given positive complement fixation and agglutination tests for contagious abortion. During a period of eight months samples of milk taken from each quarter have repeatedly given negative agglutination tests.

February 25, the right rear quarter was injected with 35 c.c. of a 48 hour broth culture of *Bact. abortus*. The following two days there was partial agglutination by the milk from the injected quarters while the others remained negative. The third day, milk from the right rear quarter gave a strong agglutinating reaction and from the other quarters gave a partial. The fourth day, milk from all four quarters gave a strong reaction. This continued for about a week and then gradually died out until the milk from each quarter was again negative. This seems to show a local production of the agglutinins due to the presence of *Bact. abortus* in the milk.

The history of two cows whose milk agglutinates the abortion bacterium is as follows:

Cow A. A cow that has a record of several abortions, the last, January 1, 1914, has given milk with a strong positive agglutinating reaction in each quarter since April 24, 1914, when the first test was made. *Bact. abortus* was isolated from this milk January 10, 1914. Guinea pigs were inoculated with the milk and became affected with the typical lesions such as are caused by a pure culture of *Bact. abortus*. Recently, a pregnant guinea pig, inoculated with this milk, has aborted.

Cow B. This cow has given milk having a strong agglutinating power for *Bact. abortus* in each quarter since July 20, 1914 when the first test was made. Milk from each quarter, inoculated into guinea pigs August 4, 1914, produced lesions typical of those caused by *Bact. abortus*. The cow aborted a 7 month fetus November 27, 1914.—[L. H. C.]

The officers elected at the last meeting of the South Carolina Association of Veterinarians are: F. P. Caughman, president; Robert O. Feeley, vice-president; B. Kater McInnes, secretary-treasurer.

A PUBLICITY POLICY FOR THE PROFESSION•

F. F. SHEETS, Van Wert, Ohio.

The social and industrial life of America has at no time given gratifying evidence of having gained any very permanent impression of the indispensable share of labor that has been allotted to the veterinarian.

We, who are sometimes inclined to think that we have spent too great a portion of our lives in the insufficiently remunerative work, are repeatedly forced to realize that the public estimation of the men engaged, of the profession as a whole, is not deeply appreciative of the splendid personnel, of the careful educational preparation, or of the arduous labor involved; all of which should afford us a more stable rating among the men of science whose benefits to mankind are readily obvious.

Any means that shall afford the public an opportunity to know more of the activities of a secluded group of men, laboring for the maintenance of health and utility of animals and man, deserves the greatest consideration if it does not violate that dignity which should be conserved in all professional life.

Recognizing the value of precept and experience available through the generous offer of cooperation extended by Dr. Frederick R. Green, secretary of the Council of Health and Public Instruction, a section of the AMERICAN MEDICAL ASSOCIATION activity, it is desired to submit, for more extensive adoption, a policy that has already proven practical in publicity campaign work of a medical character.

As a matter of practice, advertising might be defined as the means by which the conveyor gets in touch with the prospective customer, and while in the strict interpretation of that term, it has long since been decreed that the veterinarian shall not advertise, the time has arrived when we must get in touch with our clients to the extent that only the intimacy of that term implies.

Probably the popular conception of publicity is worthy of our consideration; it appears to be regarded as a refined type of advertising and refers more to a systematized educational campaign on broad lines, in matters not always essentially commercial, while ad-

*Presented at the meeting of the A. V. M. A. Section on Practice, Oakland, Cal., September, 1915.

vertising is the bold, direct appeal calculated to sell definite commodities.

Clever advertising men seem to concur in the opinion that all appeals to that class of men who form possibly, the larger proportion of our clients, must be dominated with a conditional offer of free books, free incubators, free ponies, free corn cures, free jewelry and free advice.

This extension of what, in the perusal of farm journals, we find they hope shall be accepted as some form of Utopian generosity, appears to be the order of the day with men who are, no doubt, specialists in the matter of effectively addressing the public.

Politicians know the efficacy of playing upon this same credulity, but if he cares to succeed, the veterinarian's domain is far too restricted to permit him to forget that the best business interests and instincts of his clientele must be appealed to for a commercial decision of the value of professional attention.

The economy of early treatment and the pecuniary advantages in the application of preventive medicine principles are the superior arguments by which we can appeal to men. Dependence upon chicanery and the temptation to take advantage of the tendency toward superstitious faith in medication, lead to the attainment of a most uncertain standard of professional reputation.

There exist few people in rural communities but know, in their own way, something of the value of the services of the local veterinarian. All too frequently they tell us of live stock disease or injury they would have submitted earlier, had they but known that modern scientific developments stood ready to cope with many heretofore unconquerable conditions.

Little do such stock raisers suspect that our knowledge extends far beyond familiarity with some vague group of remedies said to be beneficial in so called colics, fevers and the healing of wounds; even our neighboring physician is usually surprised to find that we are informed in bacteriology, can make practical suggestions regarding production of sanitary milk, or that some of us have the presumption to offer some really creditable arguments concerning the assimilation, in opposition to the recently assailed inhalation theory of tubercular routes of infection.

The ramifications of the various functions of veterinary activity are so extensive that few of us really appreciate the vastness of our own enterprise. Comparatively few in this busy land of ours

pause to consider the untold interests of humanity, of producer and consumer served by one or more veterinary divisions of this little appreciated branch of the great army of devout men who have enlisted under the red cross emblem of medicine.

Food, industry and health are essential to human happiness. Their consideration in a careless, insincere or dishonest manner is ruinous.

We can best serve the economy of national affairs by continually insisting that the public shall realize that the veterinarian is an important factor in all movements contemplating the conservation of the public health.

Any one who has been engaged in association activity in behalf of the veterinary profession will confirm the statement that in the numerous efforts to better conditions in many of the states and in the army, our petty numerical strength, our political insignificance and the prevailing unfamiliarity with the importance of our varied functions, has formed, in almost every instance, the obstacle we have never yet successfully assailed.

It logically follows then, until we succeed in impressing not only the live stock owner, but all of the public to be benefitted by the measures that are serving to increase our efficiency, we have not made a place for the consideration of our affairs in the legislative bodies of our commonwealths or of the nation; neither have we instilled that idea of increased resourcefulness of modern veterinary advice so important to the successful popularity of the practitioner.

Just to recount some of the things we accomplish: we select suitable types of live stock from the best offered by this and other lands to become the foundation of the industry in this country; we reject the diseased animals offered for import; maintain rational live stock quarantine regulatory measures; prevent disease and treat unavoidable outbreaks, heal the wounds, protect the meat supply, promote the dairy industry, and direct the manufacturing and marketing of its products; we investigate and advise in the presence of poultry disease.

We supervise agricultural education, aid in the development of the science of bacteriology and kindred branches of comparative medicine, and protect the public health from the encroachments of animal diseases that are transmissible to man.

We aid the immigrant in his movements of draft and breeding stock; suggest rational care and shoeing of the draft animals; are

far sighted in our advice concerning breeding and those measures that perpetuate the live stock industry, and cooperate in the work of the humane society.

We are in demand when animals are placed before the people in competitive exhibition; we are the consultants called by the owners of indisposed pets.

We have our place in the study of biology and natural history; must help in the instruction of the agricultural student; serve the army, and aid in the defense of the nation against pestilence.

In the annals of human endeavor do you recall a profession of broader accomplishments, prepared to serve in so many fields of usefulness; a profession recruited from such as can qualify as scientists and be content with the meager remuneration of mechanics; college trained men who must violate natural esthetic tendencies and be content with less compensation than is the share of the artisan?

Education is a slow process but its acquirement among men interested in live stock production, both owners and veterinarians, is rapidly demonstrating the dependence of one upon the other, and this condition is arising from a commercial rather than any sentimental view point.

No business could have withstood the waste and disregard of business principles as has agriculture and live stock production, despite government advice and subsidy, but the old order is slowly changing. Somewhat reluctantly men are comprehending the deeper significance of the industry until there exists scarcely a community but evinces the influence of at least one trained man.

Occasionally, just as in the history of veterinary education, men of few elementary requisites of agricultural proficiency, have directed their efforts in subjects for which they possessed almost no practical attributes, but on the whole the results of progressive agricultural education are inevitable.

Appealing to men who have insisted that education is imperative in the preparation for a medical career to be exerted on animal life, uninformed adventurers into the realms of medical science who depend upon extending the opinion that their ability in live stock doctoring is a miraculous gift, may encounter some difficulty in overcoming the prejudice training affords the farmer, especially if trained veterinarians foster this inclination by proper conduct and a conservation policy for application to all phases of the health and service of the live stock belonging to this class of clients.

In short, as we go from case to case, we fail if we but treat the animals immediately presented for our consideration, and neglect to extend the owners conception of the less apparent complications, such as the depredations of infection, the subtle loss of energy in the presence of communicable diseases of even apparently the lowest virulence.

A suppurating wound, a mild attack of so called distemper, a slight skin infection, any disease or parasitic invasion among meat producing animals or other live stock, no matter how trivial, is a waste, is money dissipated in a way that never can be recovered and the economy of modern methods is rapidly demonstrating that farming can no more ignore economic business axioms than can any other industry that has a responsibility to the commonwealth.

Manufacturers and purveyors are incessantly laboring to supply the market with goods of the best possible quality because experience proves that the character of the demand has had a radically improved tendency occurring within the last few years. Entirely too many of our friends from the farm insist upon flooding the market with three teated cows, unsound draft animals, diseased beef and hog cholera pork, and credit themselves with a really good deal only on such occasions when they have succeeded in reaching a market without acquainting the purchaser with the defective conditions. Every transaction of this kind is destroying confidence and ruining agricultural business reputation and has been permitted to survive for no other reason save the imperative demand for food materials.

Presuming it is no exaggeration to state that a veterinarian can go into almost any stable and point out a minimum average loss in excess of one hundred dollars, preventable if prompt attention could be made the order of the day, reminds us that regardless of our party affiliations, we are being forced to realize that modern business and the trend of the government toward certain socialistic policies, will eventually prompt the commonwealth to further restrain questionable methods and as a result agriculture will be held for a less wasteful accounting of the stewardship.

Individually, in the course of his practice, the veterinarian, in a diplomatic manner, is able to exert a very beneficial influence in correcting conditions that have permitted the live stock owner to remain unadvised in the matter of the commercial significance of prompt adequate attention to pathological conditions which he is inclined to regard as too trivial to demand attention. Even with the

use of discretion in making suggestions the practitioner encounters the danger of being accused of ulterior motives.

Present day advice to farmers through the press and his own periodicals, dominated by the prevalent idea of the fascination of the suggested free service, is a joke to the well informed man but a most serious thing to our profession because it places the popular estimation of the veterinarian on no higher plane than that of the disreputable, discredited veterinary column hack who repeats treatments and advice that was obsolete long before Heck was a pup.

The present practice of the farm press, collecting annually twenty-five cents from Farmer Dupe of Squedunk Corners for the privilege of sending him innumerable pages of high priced advertising matter, paid for on a circulation basis by gigantic business concerns, is apparently inspired with the most philanthropic motives to supply the public with all kinds of commodities free. The paper co-operates by a free veterinary advice column sometimes venturing so far as to indorse the nostrums further guaranteed in the advertising section.

This palpable duplicity that cruelly calculates the revenue to be derived from questionable publicity solely because it has gained that dignity that is presumed to come with public print, we might in no very remote time, be able to supersede with practical advice in matters familiar to the veterinarian, presented by some representative members of the profession who have a commercial regard for the permanent value of integrity.

The lay reader is not to be interested in a technical description of biological detail explanatory of disease propagation. Loss and nothing but loss and its prevention can gain his attention.

In recognition of this fact, knowing the difficulty of maintaining accuracy in popular articles, the physician has found it necessary to select specially trained men, who show proficiency in holding the readers attention by concise statements concerning only such portions of a subject that are so obviously vital to his welfare that no ulterior project can divert his attention.

The devastation of hog cholera, so called Kansas horse disease and the continuous subtle destruction wrought by animal tuberculosis and similar alarming situations, are the active causative agents in the production of periodic hysteria on the part of the editorial and lay writers, who proceed to rejuvenate superstitions, reiterate obsolete theories and advance absurd advice among panic stricken

owners already rendered incapable of using sane judgment in the presence of an apparently inevitable calamity.

Comment upon such grave matters, on the part of uninformed men possibly sincere in a few instances in a desire to render service, but frequently impelled by the opportunity to levy tribute, gain undeserved notice from the chance reader, since such effusions are invariably prefaced with the inference that the situation is unknown in the annals or beyond the control of the veterinary profession.

The resultant injury is two-fold, the owner becomes the prey of the nostrum purveyor and the profession is afforded no ethical opportunity to justify itself until long after such situations have become matters of historical interest.

The basis available for comparison applicable to our affairs from any publicity campaign work comes from a bureau termed the Council of Health and Public Instruction, laboring on behalf of the AMERICAN MEDICAL ASSOCIATION. The data of their four years' experience proves that articles dealing with disease of present day interest, practical suggestions derived from their modes of transmission and precautions for prevention, given the widest possible publication with the cooperation of the best element of the press, becomes a potent incentive prompting the lethargic physician, who has been content to rely upon the medical information of years gone by, to get in touch with modern teachings that of recent years become matters of almost common understanding.

The practicability of such a bureau for our profession would be worth its maintainance in placing fundamental veterinary truths before the public persistently, precluding the possibility of indifferent unprogressive men continuing to delude even part of the people as to what in reality constitutes the worth of modern veterinary services.

A profound science is involved in the consideration of the subjects of veterinary advice, of live stock hygiene. The incomplete and inaccurate articles now appearing are occasioned because editorial attention has not been called to the greater possibilities by representative members of the profession.

For instance, in addition to the inexhaustible fund of information available for publication under veterinary direction, it is a significant fact that whatever beneficial services might on rare occasions be ascribed to the cross roads horse doctor, his limitations, his very existence in Ohio and other states is costing more money in

fatalities and preventable epidemics than the deterioration of any other business could possibly survive.

Would it be an interesting comparison to show that the horse doctor quack is the last survival of his species? Voluble illiterates can still go into many communities and find a few dupes who will engage them to preside over a critical emergency involving hundreds of dollars in live stock, yet this same type of man would not for a moment be considered to possess sufficient mental capacity for the careful work in making a farm ditch.

The proposition submitted is ethical. It has been passed upon by the highest medical court of the land. They have offered the genesis of a work that at no distant date must receive associated activity on the part of our profession, for initiatory procedure anticipating a definite publicity policy.

The selection of a publicity representative should be based upon ability to express that valuable consensus of our professional opinion of the commercial importance of live stock sanitation, hygiene and kindred topics, assembled by some one possessed of a vital interest in the practitioner and who is familiar with our situation as viewed by men, who sooner or later will become interested from the broad basis comprehended by comparative medicine.

Colleges and state live stock commissions have been engaged in extending information through the channels we contemplate using. Obviously their efforts have been pregnant with the indispensability to the farmer, of the specially trained men who overflow these departments.

The men who, after all, are up against the daily problems of live stock disease, are lost sight of in political despotism; else no sincere effort to change live stock production methods would gain recognition without their support being assured.

The efficiency, the purpose of such work as can be done by men acting from state offices, can definitely be measured by their efforts to engage the cooperation of the practicing veterinarian, whose active interest and local concern for the good of the service will broaden as his advice is sought. Laboratory results are rendered worse than impracticable in the absence of advice from a field man, acquainted technically with the subject and acquainted personally with the people of the locality selected for operation.

Do you appreciate the advantage to the farmer, to the live stock interest at large, to the public and to the veterinarian if the

innumerable details of mutual concern could be discussed through the daily and weekly press and various periodical and farm journals; discussed in detail in terse articles presented in a manner that will bring us in an intimate relation with these various groups who shall have a graver appreciation of the veterinarian's vital influence in matters of public welfare?

The possibilities of the presentation of pertinent matter are innumerable. We never had a chance for spontaneous recognition, we know we can not depend upon legislating ourselves into business, we do not expect to intrench ourselves and supply openings for the veterinary graduate through the kindly offices of state or federal influence.

If efficiency is secured every divergent interest, every state department is deeply concerned in its own welfare, and from them we have that lesson of concentration of definite aims to learn. When are we as a representative business organization of our profession, going to begin taking an interest in the commercial aspect of our own enterprise?

We have services to advertise, the practical application of a science to promote, a demand to create; we must cease extolling the other fellow; we must, for a time, desist in the endless pursuit of the intricacies of hog cholera serum production and exhaustive research work; devote our energies outside of the further promotion of technical collegiate activities until we have aroused the business instinct that shall refuse to burden our programs with men at variance with our purpose to promote the business interests of the practitioner, and of the veterinary fraternity at large.

We want just as large a portion of the people as possible to keenly realize a considerable dependence upon our proficiency. We want to get in touch with the animal husbandryman in a business relation that will make us not his occasional adviser, but an incessant confidant because he shall come to realize that indifferent attention to animal health is not consistent with good business.

Could any conceivable opposition long withstand the efforts of earnest veterinarians to justify their position in a systematic manner carefully calculated to inspire the widest interest in articles vital to every live stock owner, if we insist that truth shall be made to prevail and all promotion of foibles, fakes and politics shall be eliminated?

This honesty of purpose is today appealing to publishers enter-

ing all fields. They are denying questionable advertisers, exposing fraudulent concerns and for the reader are demanding a dollar's worth for every dollar expended.

We sometimes become so aroused over the atrocious inaccuracies the press fosters upon the reading public, that we seriously challenge the good faith of news paper and farm paper men who permit their columns to carry a class of agricultural matter that even the uninformed readily recognize as being of the most doubtful value.

Our friend of the press immediately counters with the statement that he is compelled to pay his money for columns or pages of this character, the best his bureaus offer, and if the market affords no better he knows no one more to blame than the silent veterinary profession. An overworked publisher can not constitute himself a censor of such technical matter.

Admitted then, that the profession is awakened to the possibilities, that the press desires an improved source for the live stock and comparative hygienic matter they handle, that the reading public is receptive, the natural query arises as to how we shall go about the work and what it is going to cost.

To be effective it appears that possibly most of the field embraced in the domain of the AMERICAN VETERINARY MEDICAL ASSOCIATION should be investigated in a survey which might be conducted through the state secretaries.

The information derived would serve as a basis for the estimation of the number of available publications, their class, the number and character of readers to be served and the possibilities of extending our activities, together with such further data that would become necessary in the labor of inaugurating what should become a very extensive systematized work, embracing every attractive feature that will help present the numerous unheralded functions by which the several branches of the veterinary profession serve the people.

There can be no doubt that the time is propitious to join forces with such a laudable ambition that seeks to place business on a firm basis, regarding the prime requisite of commercial feasibility, granting every concession consistent with ethics, to the intelligent inquirer seeking detail in subjects involving live stock production and comparative preventive medicine.

The favorable attitude of the AMERICAN MEDICAL ASSOCIATION in their desire to promote public instruction is assured

in advance by the many useful details of experience already furnished through the secretary of the Council of Health and Public Instruction, Dr. Frederick R. Green, of Chicago, who assures us at the same time, that the facilities of his office are at our disposal that we may, if we desire to engage in work of this character, have the benefit of a proven policy in successful operation now almost four years.

Coming as it does from a source high in the council of the representative medical organization of this continent, the kindness of Dr. Green constitutes a rather significant recognition of our profession and deserves the gratitude of the men engaged in the practical application of the principles of comparative medicine as they become available to the veterinarian.

Recognizing that it is possibly the assumption of functions of a committee to be appointed by this body, should the promotion of publicity be received with favor as its practicability surely merits, the privilege is yet asked to make suggestions.

For the purpose of this and numerous other functions best served through formidable organization activity, would it not be promoting efficiency to encourage the numerous local veterinary medical associations of restricted fields of usefulness located in cities and fractional portions of many of the states, to maintain their present identity but to become subsidiary units of their state associations which in turn should be made provincial departments in the various present and future activities of the AMERICAN VETERINARY MEDICAL ASSOCIATION?

This is another idea stolen from an association that has succeeded in doing more for its membership than ever has been accomplished for the veterinarian by any measures that have been instituted in his behalf.

Finally, in arriving at an estimation of the cost of operating a bureau for promoting instruction relative to the affairs of veterinary interest, no approximation is applicable until it could be determined as to the extent and frequency with which it would be necessary to forward members of the press we shall gather upon our mailing list, copies of bulletins containing articles from which they desire to select for publication.

Dr. Green's bulletin is forwarded weekly to 5000 publications, dailies, selected weeklies, farm papers, educational papers and a few labor papers are reached at a cost of eighty-two cents each per year.

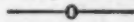
It is probable that the number available for our effective work would be considerably less and the number of mailings should possibly not be over half as many but we could scarcely hope to inaugurate the work at the above significant figure, because the cost of production is minimized through cooperation of other branches of the AMERICAN MEDICAL ASSOCIATION activity.

However, the cost of preparation charged as accurately as possible against the number of articles actually given publication is after all what we should really be interested in and estimating as carefully as can be done by the aid of the press clipping bureau, we find that to our amazement this is done at an expenditure of less than four cents an article.

Further than this comparisons appear to lose their value and only experience could lead to accuracy.

If this project is possessed of merit, and it is; defend it from the jeopardy of him who dares to suggest this announcement comes in advance of its time.

The shores to which we point may not be those of Utopia but they appear prosperous and for our transit thence the bird like craft swiftly cleaving the air is early destined to supplant the lumbering barque that ploughs a troubled sea.



DISCUSSION ON THE INTRAPALPEBRAL TUBERCULIN TEST*

DR. NØRGAARD of Hawaii. I began some seven or eight years ago to try to eradicate tuberculosis from Honolulu and the city and county of Honolulu which includes the Island of Oahu.

In the province of Honolulu proper, there are some two hundred or three hundred cattle but our tests in recent years includes some four thousand or five thousand head of cattle from the Island of Oahu—not dairy kine but cows milked only a part of the time. I began with a subcutaneous test and was sorry to find that we had about thirty per cent tuberculous cattle. We had succeeded in getting the Board of Supervisors of the municipality to pass an ordinance requiring that animals from which milk was being sold must be tuberculin tested. That is as far as it went but I found in the old Statutes of the Territory, a law which made it a misdemeanor to sell, dispose of in any way, etcetera, any animal infected with an infectious or contagious disease, dangerous to human happiness.

*The report to which this discussion relates was published in the October, 1915 number, page 121.

Of course we classify tuberculosis as one of those diseases and the first time I caught a man selling milk from tubercular cattle that had been tested and branded, I had him brought into police court and fined. Since that time the law has held good and no condemned tuberculin branded reactors are any longer sold for dairy purposes; the carcass can be sold only when slaughtered and sold for beef.



DEMONSTRATION OF INTRAPALPEBRAL TEST

The following year, that is, after Dr. Ward and Dr. Baker published the article on the intradermal test as first introduced by Mohler and Martin, I took it up immediately and re-tested a number of the subcutaneous reactors and found the results were satisfactory. Since that time and for the past five years, we used the intradermal test exclusively and I have so far to find a reacting animal which, on post-mortem examination, did not show the lesions; some have been small, others have been large. Of course, during the past three or four years, we have had practically no extensive lesions. We did away with them the first three years.

Two or three years ago we changed from the injection in the subdural fold to the lower eye-lid and we have used that method exclusively since. A second year's test gave about seven per cent, the next, five, and the next, four, and our last test, this spring, brought us down to two per cent, maybe 2.8 per cent, that is for all cattle on the island that are being at all used for milk. At the same time, inquiries from the local board of health, two years ago, as to whether there had been any perceptible decrease in the number of cases of infantile tuberculosis brought the astonishing result, when looked up, that infantile tuberculosis, that is, all cases of tuberculosis in children under five years of age have been reduced in the city and county of Honolulu to less than one-third of what it had been in previous years while similar cases have increased in number in all other islands where no effort has been made to eradicate tuberculosis.

The same results have recently been reached in Leeds and Manchester, where similar conditions existed. Where efforts have been made to eradicate from the commercial milk the tubercular germ, I may further say that every reacting animal has been destroyed and that not a cent of indemnification has been paid. That may seem a pretty hard proposition, but it can be done.

When we started in, the dairy men who cleaned their herds raised the price of milk two cents a quart and I have figured out that the milk consumers of the city and county of Honolulu have paid in that way, at the rate of two hundred dollars per head for every one of the thirteen or fourteen hundred head of reactors that we have destroyed. The cattle probably were not worth to exceed one hundred and twenty dollars nor more than one hundred and fifty dollars per head. The milk consumers have not objected to paying the increased price and, while it is safe to say that all of the money certainly has not come back to the pockets of those who lost the cattle, it has been converted into other channels. I take it, the milk dealers have profited most by it because the milk producer, even today, does not get more than seven or seven and a half cents for his milk, whereas, it sells for twelve cents. I may add that in no single case has it been necessary to go to the courts about any case.

We use the double disc aluminum tag serial number A12909 and we put that in the ears at the time of the injection. When on the third day, we come back to inspect, we have a pair of sharp clamps which are put on the ears of the reactors. If the reactors show we take this clip off by severing it with a pair of forceps and a brand is put on the face.

Everybody there knows now that if they try to sell or otherwise dispose of any of those reacting cows (in the first place nobody wants to buy them) they know what the results will be and it has only been necessary a couple of times to suggest that prosecution would be made and things have been straightened out immediately.

In the city test the two largest losers were the people who could afford it; one of them lost five hundred head, every one of which went to the slaughter house.

At the last meeting of our legislature this spring, a member of the Agricultural College, with which I am connected, introduced a bill for the indemnification of those milk producers who had made an actual effort to clean their herds and protect them against reinfection, where there was no neglect on their part. The bill met with favor and we were promised ten thousand dollars for a starter, when a few of the milk producers took it into their heads that there was not going to be any more tuberculin testing and a few of those people have refused to have their herds tested on various grounds for upwards of a year. They succeeded in killing that bill. We even went to the Board of Health Association and said to them, "What are you going to do about allowing your clients or patients to let their children drink tuberculous milk again? Are you going back to selling tuberculous cows with the corresponding increase of tuberculosis in children or are we going to get rid of the last two or three per cent we have? They thought that we had better get rid of it, so we notified the obstructionists that their milk would no longer be sold or tolerated on the market unless they had their cows tested. They had them tested. Unfortunately, one of these men had twenty-eight reactors out of a hundred and thirty-eight and another had eighteen out of sixty-four and another had eight out of eighteen but those were only the ones that had let more than a year go since they were tested last and who thought that there would be no more tuberculin testing. All of the rest of them, I am glad to say, sixty per cent of the milk producers had herds absolutely free from tubercular animals for two years, some for three years, some for one year and so it came to the point that every one who had a reacting animal was willing to let us make the test every three months until he was clear and until he had the reactors down to three or four per cent.

We tested every three months until it was cleared up, then two times a year until we had every man's herd cleaned up. Now I think we will get rid of the last trace we have and we have taken up the work on other islands where every little cow herd seems to have a considerable amount of tuberculosis. Unfortunately there was considerable opposition to the work but I do believe we shall be able to clean out the disease entirely from the island and without paying any compensation.

I may add a few suggestions: if you gentlemen wish to take it up in your special districts, I believe it can be done everywhere in the world in every country without asking for million dollar appropriation or for hundreds of thousands of dollars, simply by allowing the milk producer to raise the price of his milk and back him up in it. This must be done by an ordinance of the municipality

or medical board of health. You must have the cooperation of the board of health and of the municipality and most of all the medical fraternity. They are the ones who rule. If they agree to help you and to tell their clients and patients and let them know that milk from tuberculous cows is dangerous to the children, that it is well worth while to pay a cent or two more for the milk so that it is clean, I am sure you can succeed.

The first man who came to the Board of Health and demanded a clean bill of health and cleaned out his herd had one hundred clean Jerseys. He raised his price two and a half cents a quart and in the third month after he received his letter, giving him a clean bill of health, the demand for his milk at twelve and a half cents a quart more than doubled in one month, and as I say the price has been maintained ever since.

We have no actual rules or have never enforced any rules to compel a man to take his animal out of his stable. If we had any trouble with a man, our plan was to go and see the people he sold the milk to and have them call him up on the telephone and say, "I understand you had your herd tested the other day." "Yes." "I understand you have a sick cow." "Yes." "Have you still got that cow?" "Yes, I still have it." "Well, you need not send me any more milk." Later another party calls him up and the same thing happens, then another customer and probably after that, he will call me up and say, "For Heaven's sake, Doctor, I will send that cow to the slaughter house." That is the way it is done in every case. That is about all the force we have used. There has been simply moral suasion and it shows you the benefit which can be derived from clean milk from healthy cattle. I wish you gentlemen would get at it because I believe it is up to the veterinarian and the veterinarian alone, if backed up by the local sanitary authorities. He can certainly do it and he must do it. Do not ask for laws and appropriations but get to work. Get the support of your local papers, put a few articles in now and then, stating what tuberculosis is and how dangerous the germs of tuberculosis are to the children through the milk and the rest will be solved.

They will come to get their cattle tested. Tell them to get it out of the consumer by raising the price of milk and that will more than pay for the cost of the cows you have to condemn and remember I started out with thirty per cent.

DR. MCNAIR: I would like to ask Dr. Nørgaard if they have there a certified milk supply and also if pasteurization of milk has been practiced.

DR. NØRGAARD: We have no certified milk but we succeeded in getting one of the best pasteurizing machines installed over there at the plant of the gentleman I mentioned who lost over five hundred head.

I believe when he saw how big a percentage of reactors he had,

he tried to have pasteurization take the place of purification. He sent to New York for one of the Boucher electric milk purifiers which I tested thoroughly and am still testing at intervals. It does the work all right, there are ten to one hundred, or something like that, bacteria per c.c. It absolutely cleans every germ and the milk is not spoiled by the test. I will say that seventy-five per cent of the milk consumed in the city of Honolulu passes through that milk refiner and I believe it is clean.

The Dairyman's Association co-operates in this particular, so that about seventy per cent or seventy-five per cent of all the milk used in Honolulu passes through that machine.

DR. V. A. MOORE: I would like to say a word in regard to the use of tuberculin. I think Dr. Rutherford brought out a very good point in connection with agents. I think that some of us have lived long enough, and have seen and applied annually, various tests a sufficient number of times so that it is perfectly rational for us to consider some of the limitations of methods that in the past have been relied upon practically as absolute.

I think that the papers we have heard this afternoon in connection with the use of tuberculin, and the various methods of applying it, together with the paper which preceded it on the biologics and their effects, cannot but raise the grave question as to why we get these reactions and what their interpretations are. Those of you (and many of you know I have a great deal to do with the testing of cattle especially for interstate trade) who are working along these lines, are interested with me in this question.

Some years ago I pointed out that in the assembling of sound herds, it is important to buy animals from sound herds. That a specific test like tuberculin applied to a particular individual had nothing like the certainty that comes from buying from a sound herd. There are a number of men in the certified milk business who have come to this conclusion.

The analyses of failures in the use of tuberculin as a diagnostic agent have given us quite definite information relative to its limitations in detecting tuberculous-infected cattle. These may be classified into five groups, of which three pertain to the maker and user of the tuberculin and the others to the disease itself. These conditions are as follows, namely:

1. When the tuberculin is made from a strain of tubercle bacteria not suited to that purpose, or, when the tuberculin, by reason of the method used in preparing it, does not contain sufficient tubercle bacteria protein.
2. When in the application of tuberculin sufficient care is not taken to observe its effect upon the individual.
3. When the interpretation of the manifestation of the effect of the tuberculin is not made in accordance with the laws governing the reaction between tuberculin and tuberculous lesions in a living animal.

4. When tuberculin is applied during the period of incubation.
5. When tuberculin is administered to animals in which the tuberculous lesions are arrested, healed, encapsulated, very extensive or, in any other stage where a reaction may not be possible, the tuberculin fails to give indication of the presence of the disease.

The first three of these reasons are so obviously self-explanatory that I need not dwell upon them. The failures resulting from these causes should not be attributed to any limitation of properly prepared tuberculin, although in the past many unhappy experiences have been traced to the tuberculin used. The fact that tuberculin is not properly made should not be considered as an argument against it. Likewise, the failure to detect the reaction through incomplete observation or knowledge of the subject, or the failure of an animal to react while in the period of incubation, is not the fault of the tuberculin. However, many recently infected animals that are still well within this period have passed the test and subsequently been found to be diseased. Usually the tendency of the purchaser of animals tested at this stage of the disease is to condemn the tuberculin or speak with uncomplimentary epithets of the person who applied it.

The early report of the use of tuberculin in this country, together with the pathology of bovine tuberculosis, as published in Bulletin No. 7 of the Bureau of Animal Industry, pointed out the necessity of careful observation of the temperature of the animal to be tested both before and after the injection of tuberculin. Twenty-four hours were considered necessary for pre-injection temperatures and perhaps longer than that after the injection. This procedure, however, did not meet with the approval of the practitioner or cattle owners, because of the time required. Consequently, the method was very soon modified to taking but one or two preliminary temperatures and few post-injection ones. The corollary to this was that many cases that would react late were missed. This has given rise recently to important articles calling attention to late reactions. A result of this abridged method is found in many herds that have been tested, the reactors removed and subsequently they were found to be infected from the undetected case or cases that escaped the initial test. While a large majority of reactions will be detected in from twelve to eighteen hours after injecting tuberculin, a few cases will not give a reaction until from eighteen to thirty-six hours after. It is not unlikely that occasionally a reaction will take place still later.

Again, the rise of temperature necessary to indicate a reaction was thought to be at least 2° F. above the maximum pre-injection temperature. Then a rise of 1.5° F. was accepted as sufficient evidence of infection. The true reaction—namely, a gradual rise, a festidum and a gradual decline—was not seriously considered as the essential indication of a temperature reaction. However, the one-

time standards for determining a reaction are no longer rigidly adhered to. The interpretation of the response of the animal body to tuberculin, be it thermal or organic, is carefully studied and the decision as to whether or not there is a reaction is made as a result of the study of the case in its entirety. One of the difficulties in this work is to decide upon the doubtful reactions. This cannot be accurately done, except to consider all such cases as questionable and retain them for further study and subsequent testing. There are questions that no man can answer accurately yes or no.

The most commonly encountered failure is where the lesions are in such a stage of healing or encapsulation that a reaction does not follow the injection of tuberculin. It often happens that a subsequent test will be positive, and that again followed by negative results. These have been very confusing, and in actual dealings they have given occasion to unfounded hypotheses regarding the integrity of one or more of the parties concerned. These failures occur more frequently in herds of long-standing infection or in those assembled by purchasing non-reacting individuals from such herds. The International Commission of the American Veterinary Medical Association for the Study of Bovine Tuberculosis reported that when 50 per cent. or more of the animals in a herd reacted the entire herd should be considered and treated as tuberculous.

The limitations of properly prepared tuberculin in detecting tuberculous animals are restricted: (1) to errors in applying it; (2) in failing to ascertain all that it may reveal by way of thermal and organic reaction; and (3) to the failures in securing a reaction when the stage of the disease is such that a reaction does not occur. I believe we could say when the conditions are such that a reaction cannot take place. Concerning these failures we are sure only of the fact that now and then they occur. A true explanation for the non-reaction of tuberculous cattle to tuberculin must wait for the recording of further experimentation and study.

The limitations of tuberculin do not detract from its use, but add to the importance of a thorough understanding of it. Tuberculin is conspicuous among diagnostic agents for the great assistance it gives in detecting tuberculous cattle, but it should be recognized as an aid and not as an infallible test. There are two practical lessons to be taught from the results of experience with and extensive studies of tuberculin, namely:

(1) the danger of buying non-reacting individuals from infected herds—that is, cattle that have been exposed to infection and

(2) the necessity of dairymen, wishing to maintain clean herds, raising their own animals or purchasing them from healthy herds. The unit to deal with in buying cattle is the *sound herd* rather than the non-reacting individual animals.

In the dairy to which Dr. Roadhouse referred the loss was very heavy. Tuberculin does not tell us about the lesions, and it is get-

ting to a point where veterinarians are being criticised. I have actually heard them accused of wrongdoing because a man had bought an animal that had been tested by a veterinarian, had failed to react, and in six months or a year, perhaps longer, he has retested that animal and it has reacted. He puts the blame upon the man who made the first test, or the man who sold the animal. He is looking for some fraud, some unlawful act, but it may not be that. In a great many of these cases I believe the men were absolutely innocent. The supposed error can be explained in many of these cases by their not taking into account the fundamental fact that in certain instances tuberculin cannot give a reaction.

DR. J. TRAUM: We have discussed the sub-cutaneous and intradermal tuberculin testing of cattle, and the intradermal testing of hogs. In California we are very partial to the intradermal test and do not limit ourselves to either cattle or hogs, but also give guinea pigs the intradermal test. A good many of the laboratory workers are interested in determining as soon as possible by guinea pig inoculation, whether or not the material injected contained tubercle bacilli. One of the methods of saving time is to inject the animal either subcutaneously or intraperitoneally with about 2 c.c. of ordinary tuberculin and if the animal dies, or is made severely ill within 24 hours, it is considered good evidence that the animal is tuberculous. Those reactions, however, can only be obtained in guinea pigs having rather well developed cases of tuberculosis. The animal would have to remain alive for about six weeks. But with this intradermal test you can cut down the time considerably. In our experience 16 to 20 days after inoculation reliable results can be obtained. Römer, Esch and Schnurer claim that determination can be made at the end of ten days. Even with no evidence of lymph gland involvement, they were able to get distinct intradermal reaction. I have thus far tested about three hundred guinea pigs that were inoculated with suspected tuberculous material and only one failure is all I have had in this number of cases. The point of inoculation may be any part of the thorax or abdomen; we prefer a light area, buff or white. The dark area is less desirable because there is a color reaction attached to this test, and while it can be recognized and interpreted very readily in dark areas, the light area is to be preferred. The area, about two inches square, is shaven, or better still, a depilatory is applied. Shaving sometimes produces breaks in the skin, making proper interpretations at times difficult. The center of the area is injected with one tenth of a c.c. of twenty per cent. tuberculin O.T. We have used 20 per cent. tuberculin O.T. because it was recommended by the workers mentioned and have found no reason to make a change, although we believe that the purified and other tuberculins will give very satisfactory results. Reactions will appear in 24 to 48 hours, but in doing intradermal testing we do not like to interpret results at the end of 24 hours, so

we make it a point to make observations at 48 and 72 hours. Non-tubercular guinea pigs as a rule will show no swelling at the end of 24 hours, but sometimes a thickening will be present in such animals which will, however, disappear within the following 24 hours. In tuberculous guinea pigs we find three grades of reactors. The XXX reaction, the severest form, consists of a circumscribed edematous swelling (Quaddelbildung) varying in size from a quarter to a half a dollar or even larger. The central portion of this swelling shows a hemorrhagic area surrounded by a porcelain like zone and this in turn is surrounded by another hemorrhagic area. This reaction is very striking, the color changing, becoming purple and green. Such reactions last for several days. I have known the reaction to persist for eight days. The second grade, which is described as XX reaction, consists of the same picture, but without the central discoloration. The third and mildest form, the X, consists of a large swelling usually about the size of a quarter, but may be a little smaller, which persists for at least forty-eight hours. I have found this test of great help in experimental work. Frequently, tests were made when there were no physical indications of tuberculosis in the guinea pigs, and I have been able by the reactions of this test to tell whether or not the material inoculated into these animals contains tubercle bacilli.

DR. MCNAIRS Dr. Traum neglected to state one point of interest. With what materials did he produce the disease in these pigs? I happen to know, but I thought that the rest of you might be interested to know.

DR. TRAUM: These pigs are ordinary guinea pigs used in routine work examining feces, sputum, milk and other secretions from cows. Out of three hundred guinea pigs which have already been tested, practically all have been autopsied. Tuberculin is injected by taking hold of the central portion of the shaven area with the thumb and index finger of the left hand and the use of a twenty-five or twenty-six gauge needle of about a quarter of an inch in length. The needle is slipped into the skin and the tuberculin injected intradermally. A bleb about the size of a pea should result from this injection. This is then carefully massaged or stroked.

DR. MOHLER: We have also applied the intradermal test inoculating tuberculin in guinea pigs with very satisfactory results. Of course this method has been applied before in tuberculin injection, especially by a man we have in North Dakota. He has even found the reaction in a bird, like the golden pheasant.

Dr. Alfred Savage, formerly of Macdonald College, Quebec, has been appointed Lieutenant and "V.O." to the 11th Field Howitzer Brigade, 3d Divisional Artillery in England.

SOME EXPERIMENTS WITH BACTERIAL VACCINES FOR THE CURE OF SPLENETIC TICK FEVER IN CATTLE

R. L. RHEA, D.V.S., San Antonio, Texas.
G. W. MACKIE, V.S., Detroit, Mich.

SYMPTOMS: Texas Fever, Tick Fever, Bovine Malaria, Spanish Fever, Bloody Murrain, Southern Fever. Texas fever is an infectious fever of cattle, characterized by high temperature, hemoglobinuria, destruction of the red blood cells, and presence in the blood of a protozoon, known as *Piroplasma bigeminum*, so called by Theobald Smith, the discoverer, which is transmitted from animal to animal by the cattle tick, *Boophilus annulatus*.

An interesting fact of this disease is that cattle raised in infected districts, become immune early in life, and carry infection in the blood after immunity has been established, which infection may be transmitted to non-immune animals by artificial inoculation, while they, themselves, remain practically well and healthy.

ETIOLOGY: The cause of the disease is an invasion of the blood cells by the *Piroplasma bigeminum*, which is transmitted to the susceptible host by the cattle tick, *Boophilus annulatus*. These organisms pass through the following stages, producing the disturbances enumerated herein, as recorded by Lignieres as follows:

1st: The pear-shaped bodies which are found in the red blood cells are usually connected.

2nd: The round cells with the dividing nucleus.

3rd: Larger infectious organisms accompanied by smaller organisms, which Lignieres calls "Germs".

Just what part these so called germs play in Texas fever, we do not know, but we do know the blood from cattle, which have been exposed to the invasion, will, when injected into healthy non-immune cattle, produce Texas fever, and that immunity can be established by the blood inoculation of young cattle.

SYMPTOMS: In the acute type of the disease, which usually occurs during the hot summer months, the onset of the disease is sudden; the first indication of the disease is a rise of temperature, generally higher in the afternoon, but this variation is minimized later in the progress of the disease, when the temperature remains high—which is usually 105 to 107 degrees Fahrenheit. By use of

the thermometer the elevation of the temperature can ordinarily be detected two or three days before other symptoms appear. During the progress of the disease the respiration is quickened and the pulse 80 to 110. Presence of hemoglobin in the urine depends largely on the rapidity of the progress and severity of the attack. In mild attacks the hemoglobin may be taken up and destroyed by the other organs and no discoloration be detected in the urine. There is a loss of appetite, cessation of rumination, paleness of membranes—the course of the disease may vary but the continuous high temperature usually lasts about ten days—however, death usually comes in from five to eight days.

POST-MORTEM LESIONS: Post-mortem changes take place rapidly in cattle dying from tick fever, so all post-mortem examinations must be made soon after death, or else the lesions found may be misleading. There are no external lesions of the disease—however, occasionally an edema of the subcutis on the ventral portion of the body has been noted. The muscles are pale; otherwise normal in appearance.

Internally, the most conspicuous changes are in the spleen; this organ is much enlarged and increased in weight from two to four times; the pulp may be firm, but usually is semi-fluid so that it oozes out when the surface is cut. The liver is extensively affected; it is enlarged and congested; the bile ducts are more or less distended; the color is paler than normal. The surface is usually somewhat mottled; the gall bladder contains usually, an abnormal quantity of thick bile. The bladder may be ecchymotic. There are no constant symptoms in the digestive tract, only extreme dryness of the fecal matter may be noted from the extreme high temperature the patient suffers.

Texas fever is strictly a blood disease, so it is there the principal and most constant changes occur; the blood becomes thin and watery by destruction of the red blood cells.

DIFFERENTIAL DIAGNOSIS: Tick fever is usually differentiated from other troubles of infections noted by the presence of the specific parasite on the animal and in most cases by the history of the case. The enlargement of the spleen may be somewhat confounded with anthrax; however, the other symptoms of tick fever counterbalance any similarity.

The tests referred to in this report have been conducted during winter months (Note this has been an unusually hot winter), dur-

ing which time, the violence of attack of tick fever is attenuated by the lack of the high climatic temperature. We do not, however, think the affected animal lives because of the cold weather but the violence of the attack may be increased by the extremely high climatic temperature, while an animal may possibly recover from an equally violent attack on account of the degree of depression we find during cool weather.

The cases treated with the Streptococcus and Staphylococcus Vaccine Combined (Bio. 828, Parke, Davis & Co.) were cattle varying in age from eight months to aged animals, the temperature varying from 104 to 107½, and in many cases extreme symptoms of the disease were accompanied by emaciation.

In many cases hemoglobinuria was present; in some, there was uncertain gait accompanied by extreme weakness, short, quick breathing, high pulse, etc.

CONCLUSIONS: The body of all animals is at all times the host of microorganisms which are incapable of setting up disturbances when the body has a high resistance, but if for any reason should the body resistance drop below normal in vitality, these same latent organisms may become pathogenic.

The infection producing tick fever primarily is *Piroplasma bigeminum*; however, when by its action the resistance of the body is reduced below normal, these organisms may cause a secondary infection and with their toxins may assist in producing symptoms which accompany tick fever. The fact that the use of bacterial vaccine gives results in Texas fever, we may conclude the germs spoken of by Lignieres may be some unnamed specie of streptococcus or staphylococcus. The fact that immunity can be established by blood inoculations warrants us in saying that antibodies may be produced in the blood by proper stimulus, and as the agent used in this test work is a streptococcus and staphylococcus vaccine, so antibodies produced by this type of vaccine combat only that type of invasion, so we may conclude they play an important role in this disease.

This experimental work covered a period of six months. The number of cases treated were one hundred and forty, of which one hundred and eighteen made good recovery; these cases varied from mild cases to the most severe, we had many cases that would have undoubtedly terminated fatally, in fact the large majority, only a few would have recovered with the old line treatment.

We will classify these cases into three:—A. Class being cases treated with one dose of 1 c.c. of vaccine. B. Class those cases treated with two doses, viz; 1 dose of 1 c.c. and the second dose of $1\frac{1}{2}$ c.c. of vaccine—and C. Class, which was treated with three doses, viz; first dose of 1 c.c., second dose $1-1\frac{1}{2}$ c.c., and the third dose of 2 c.c. of vaccine.

The cases treated with more than one dose received the second or third doses three days apart. In a few instances, we gave a dose of one-quarter grain of strychnine, and in three cases we gave one pound of mag. sulph. No other treatment being given other than the vaccine.

Class A. was given but one dose of vaccine, being 1 c.c. consisting of eight billion dead bacteria.

We treated twelve cases in this class; six recoveries and six deaths. This is accounted for from the fact that the majority of the patients were very far gone before treatment was given; for instance, in case No. 10 the temperature was subnormal when we saw the case, being 96° . This patient died the following day. Case No. 11 was very severe, the patient having been ill for some time and the temperature being 108° ; this animal died at 4:30 the following morning. In none of the six deaths did the patient live more than two days. These might be classed as hopeless cases.

The recoveries in this class were six. Case No. 12 was a very severe one; the animal being unable to walk and in very poor condition. We did not see the cow again on account of the distance from San Antonio. The owner telephoned on December 2nd that the patient was in good condition and as well as ever. Case No. 24 was given one c.c. of vaccine on March 23rd and the owner telephoned on the 29th that the animal had made a complete recovery.

In Class B, all of which were given two doses of vaccine, we had twenty-six cases with four fatalities; of these we had five of the most severe type, all making good recoveries.

In Class C, we treated one hundred and two cases, with only twelve deaths; these all received three doses with the exception of six, which received four doses, the most we gave any case.

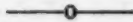
We find the best results are obtained from an initial 1 c.c. dose of eight billion, next followed in three days, consisting of twelve billion, and the third dose of sixteen billion killed bacteria.

Independent of these reports a herd of non-immune heifers were shipped to the city of San Antonio. These animals (88 in

number) received 1 c.c. of vaccine each an initial dose, $1\frac{1}{2}$ c.c. five days later, and the third dose of 2 c.c. of vaccine after a period of five days.

These calves, varying in age from six months to two years, have now been in tick infested pastures about 15 days but none have shown any effects from infection from ticks. It was also noticeable, the rapid improvement in general condition these calves made, even on very poor feed.

We beg to say that we have no doubt whatever as to the merit and curative value of Bio. 828 in treatment of Texas fever. There were 140 cases treated with $85\frac{5}{7}\%$ of recoveries.



THE PASTEURIZATION OF SKIM MILK AND WHEY AS FOOD FOR CALVES*

VERANUS A. MOORE, Ithaca, N. Y.

I accepted the invitation of your President to present a paper on "pasteurized skim milk and whey as food for calves" with considerable hesitancy. The subject comprises questions which are complicated and difficult to explain. They combine principles of sanitation and problems in dietetics. Its execution demands the observance of great care, and patience must be exercised during the development of the best methods for its application. Notwithstanding, the pasteurization of creamery and factory by-products is a practical question squarely before us at this time.

The nature of this subject is not unlike many others in sanitary and medical sciences which have presented themselves for adoption before their merits were fully understood, but which have finally become firmly incorporated in our methods of procedure.

The application of antiseptics, the preventive treatment for rabies, and the use of antitoxins, each a daily life-saving procedure, involve principles that were difficult to comprehend and still more trying to apply. In whatever field of human activity real progress is made, the controlling principle has first to be recognized in the hitherto unperceived elements of knowledge and orderly truth crystallized out of what has appeared to be a jumble of facts.

*Address given at the Meeting of the New York State Agricultural Society, January 18 and 19, 1916.

The pasteurization of skim milk and whey as food for calves includes two important factors; namely, the prevention of the spread of the germs of infectious diseases through the milk and whey, and the dietetics of heated milk. From the practical point of view the two must be considered as one problem, but for an understanding of the subject they should be separated and analyzed independently.

The principle of pasteurization, and the name itself, comes from the work of Louis Pasteur. From time immemorial the souring of beer and wine baffled all attempts at cure. From 1860 to 1865 they threatened the destruction of these industries in France. Pasteur found that there were two microorganisms involved, one bringing about the satisfactory ripening of the wine, and the other, the cause of the acid, producing sharp or sour wine. By the experimental method which he introduced, Pasteur found that by heating the wine to 60 degrees C. (140 degrees F.) it did not sour, but ripened properly. In other words, the wine could be heated sufficiently to destroy the *Mycroderma aceti* which caused the souring and not injure the *Mycroderma vini* that later developed the proper color and flavor. The heating of wine was not a new process, but the finding of the particular temperature to which it could be brought without injury had not been considered until the definite purpose of the heat was determined, and the cause of the souring and of the proper ripening ascertained.*

Later, when disease-producing bacteria were found in market milk, Soxhlet (1886) recommended the pasteurization† of milk for infant feeding. The process here, as with the wine, consisted in heating the milk to a temperature high enough to destroy the

*Simple as this process seems there was much opposition to the method proposed because it was thought to affect the flavor of the wine. This opposition became pronounced. To justify his procedure, Pasteur organized a "tasting" experiment at the *Ecole Normale*, where the critics and connoisseurs were invited. They tasted and tasted of the pasteurized wine and of that which had ripened properly without heat. Some of them pronounced the pasteurized and others the unheated wine to be preferable. Finally Pasteur presented glasses of wine taken from the same bottle and still the difference of opinion was equally pronounced, some claiming one and some the other to be better. When the critics learned that they were disputing over wine poured from the same bottle they realized the futility of their objection and opposition ceased. (Life of Louis Pasteur by Valery-Radot. 1885.)

†Rosenau states that "pasteurization as applied to milk consists in heating it at a temperature below the boiling point, followed by rapid cooling." In New York Jacobi had long practiced and taught the wisdom of boiling milk for infant feeding.

objectionable organisms and which should not change its physical properties to any appreciable degree. Many physicians objected to heated milk for children. However, the rationale of the procedure began to be understood, and today there are many sanitarians convinced that all milk for human consumption should be pasteurized. In many cities a large percentage of it is actually subjected to this process.

The advocates of pasteurization base their argument not only on the fact that it destroys pathogenic organisms that may gain entrance to the milk directly from infected cows, as in case of tuberculosis, and indirectly from people who handle it, such as carriers of diphtheria and typhoid bacilli, but also that other objectionable organisms, such as streptococci and the colon bacilli, are destroyed. The recorded results show that where pasteurization is properly done the children thrive upon the milk equally as well,* and some say better, than they do on raw milk and that in addition the specific diseases are prevented. There are those, however, who believe that pasteurized milk tends to the development of scurvy and rickets in very young children. These conditions seem to have occurred when milk was heated much higher than 140 degrees F. The consensus of opinion of those who have used pasteurized milk is that if it is properly pasteurized—that is, not heated above 140 degrees F.—it can be fed with impunity.

There is no doubt that bad results have followed improperly heated milk or that which was not properly handled after heating, but this should not be charged to pasteurization any more than strychnine should be condemned because some individual through ignorance or carelessness takes a lethal dose. The question is, Shall our babies die from infections that come through milk, as in former times; or, shall people responsible for them learn to exercise with care and exactitude methods that will prevent these unnecessary mortalities? For more than twenty years the medical profession has been struggling with this question, but finally the verdict is being pronounced that there is no justification for the death of those who could be saved by the application of reasonable precautions. The demand, is, that for human consumption milk shall be pasteurized, unless properly safeguarded by requirements

*The report for the first eighteen months of the "Milk Station Babies of Washington" shows that the average net gain for all babies, both well and ill, receiving pasteurized milk, was a trifle greater than those receiving raw milk.

such as those demanded for "Grade A raw milk" or by certification. There are sanitarians who believe that even these accepted grades of milk should be pasteurized.

I have pointed out the principle of pasteurization and its application to milk for man with the hope of its being of assistance in the solution of the problem before us. The high mortality among bottle-fed infants, and the numerous and often serious outbreaks of diphtheria, scarlatina, and typhoid fever traceable to milk, rendered it imperative that something be done to safeguard the consumer. The real experimental work in the establishment of the principle of pasteurization of milk has, therefore, been done with the human species. There are, however, questions relative to its physiological effect still to be answered, but they must wait for the results of more general and long-continued use of heated milk.

In applying pasteurization to skim milk and whey for calves exactly the same principle applies as with milk for humans. There is, however, this difference: with the preparation of the food for the child there is a sentiment to offset the extra labor and cost required in taking the necessary precautions that does not exist in the preparation of food for dumb animals. The problem, however, is the same, for we have, to balance the actual extra labor and cost of pasteurization, a reasonable expectation of growing more and healthier calves and pigs.

The difficulty with pasteurization of milk for calves is that people do not understand just what it is, or why it should be done. We are wedded too much to traditional methods. We are told that it is not practical by those who do not recognize that so-called practical men practice the errors as well as the virtues of their forefathers. Difficulties are to be overcome and progress made only by those who seek to know why they do things and also how to do them. To intelligently consider the pasteurization of skim milk and whey as an economic as well as a sanitary question in our dairy industry, it is necessary to inquire into the details and ascertain, if possible, the reasons for it. The answers to the following questions may be of assistance in this direction:

1. What diseases are spread from adult cows to calves through the medium of milk, and to what extent are these diseases actually contracted by this means?
2. What temperature will kill the different pathogenic bacteria that may get into the milk directly from infected cows?

3. Does pasteurized or sterilized milk afford a satisfactory food for calves?

4. Which is the more important, the diseases and losses produced by feeding raw milk, or the expense and care involved in rendering the milk safe?

5. Are there practicable methods of protecting young calves against these diseases other than by pasteurizing or sterilizing the milk?

The experimental work on this general subject has been somewhat limited and consequently reliable data are both scarce and fragmentary. To answer the questions, therefore, we must draw largely from the restricted experiences of individuals, and the established facts concerning the spread of disease-producing organisms, as well as the means for their destruction.

There are a number of epizootics, the viruses of which are spread through the milk. Foot and mouth disease is a good illustration of these. In the recent outbreak of that disease many herds of cattle and swine were infected through separated milk from creameries. While such diseases are not common, they are liable to occur at any time.

The common infectious disease that is known to be transmitted to the calf through the milk, is tuberculosis. The maladies that are believed by many investigators to have the same means of entrance for their viruses are: certain forms of enteritis, white scours, and pneumonia in calves, and infectious abortion in cattle. The germs of other diseases, such as anthrax, may get into the milk of infected cows late in their course.

The extent to which tuberculosis is actually spread through the milk is difficult to determine, but it is known to be very large. I have known on several occasions from 60 to 100 per cent of the calves in large herds fed upon raw milk to react to tuberculin when six months of age. Russell,* of Wisconsin, has pointed out the rapidity with which tuberculosis is spread to the different herds in a community by feeding the calves skim milk from creameries. The almost universal experience of finding growing animals infected when they have been raised on raw separated milk from creameries furnishes additional evidence of the seriousness of this source of infection. The large percentage of reacting cattle that show old

*Russell. Bulletin 143. Wisconsin Agricultural Experiment Station. 1907.

and calcified tuberculous lesions in the mesentery glands points with great definiteness to early intestinal infection. Ostertag* found that badly tuberculous milk will infect when diluted 1 to 1,000,000. This means that one tuberculous udder, among the cows supplying milk to a creamery, could contaminate all of the separated milk taken from that creamery and infect all the calves and pigs fed upon it. It is generally estimated that about 2 per cent of tuberculous cows have tuberculous udders.

The property loss sustained from tuberculosis in cattle was estimated by the Secretary of Agriculture to have cost this country \$25,000,000 last year. As New York has fully 6.5 per cent of the dairy cows of the country, we are within our pro-rata limits in putting our share of the loss at \$1,625,000. In 1908, Professor Willcox estimated that this disease costs our state \$3,000,000 annually. As milk infection is one of the most potent means of spreading the disease, the elimination of that source of infection would greatly reduce the total loss. In addition to this, there are large numbers of pigs that contract tuberculosis by eating infected milk. The condemnations for tuberculosis in swine in the federal inspection last year were 66,023 entire carcasses and 439,915 parts of carcasses. Only about 60 per cent of the hogs are killed under inspection.

Evidence is rapidly accumulating that the cause of the fatal white scours and pneumonia of young calves is largely transmitted to them through the milk. Meyer, Traum and Roadhouse† have described a serious outbreak of infectious diarrhea in calves due to *B. enteritidis* which was controlled by feeding boiled milk.

The investigations that are being carried out at the Veterinary College at Ithaca by Dr. Williams point to the milk as one of the most important sources of infection with contagious abortion. This disease when taken in its entirety, which includes, in addition to the expulsion of the fetus, metritis, premature birth, and sterility, is already recognized as being of at least equal significance with tuberculosis in the losses it occasions. Our investigations are as yet limited, but already Williams has shown that calves raised on raw milk from aborting herds practically all abort in their first pregnancy. The fact that the bacillus of infectious abortion gains entrance to the udder, where it remains for a long time multiply-

*Ostertag. Zeitsch. f. Fleisch und Milch Hygiene. Bd. XV (1904), p. 10.

†Meyer, Traum and Roadhouse. Proceedings of the Am. Vet. Med. Asso. 1915. Jour. A. V. M. A. Mar. 1916.

ing and infecting the milk, has been known but a few years.* The provisions of nature for protecting the viruses of infectious diseases and enabling them to be perpetuated is just beginning to be understood.

In the forthcoming report of the Veterinary College, Williams makes this significant statement:

"We believe it now sufficiently demonstrated that the disease is primarily and chiefly spread through the raw milk fed to young calves. * * *

"The increase of abortion is generally deplored. Yet dairymen and breeders feed milk indifferently from any cow to all calves; or, worse yet, the milk from a diseased cow, which would justly be excluded from the market, and feed it raw to the calves; or, not having a sufficiently virulent abortion in their own herds, they go to a creamery or cheese factory and obtain raw skimmed milk or whey saturated with the most virulent infection, feed it to their calves, and then wonder why, when they are grown, they abort in their first pregnancy. Why should they not abort?"

These findings are quite revolutionary regarding the mode of infection, and if further researches show that they represent the rule, rather than exceptional occurrences, raw milk will be incriminated as the most important disseminator of the virus of this serious disease. It is very important that a thorough investigation of this subject should be made.

The answer to the second question is not difficult, from a practical point of view, although a large amount of experimental work has been done to ascertain the minimum temperature and time at which tubercle bacteria are killed. In the appendix will be found the findings of numerous investigators on this subject. Thirteen experimenters found that tubercle bacteria were killed at a temperature of 140 degrees F. (60 degrees C.) in from ten minutes to three hours. All competent experimenters have found that tubercle bacteria are killed at 140 degrees F. and upward, the temperature depending upon the length of time the heat was applied.

*See article by Moore and Fitch, Report of the N. Y. State Vet. College, Cornell University, 1912-13, for a summary of the findings of abortion bacilli in milk. Evans in a more recent investigation [Washington Academy of Sciences, Vol. V. (1915)] has found the Bang organism to exist in the milk of a larger proportion of cows than previous investigators have done.

The abortion bacillus seems to be less variable, although the number of tests that have been made are not so large as with tubercle bacteria. All of the experimental work reported shows that 140 degrees F. (60 degrees C.) for twenty minutes will destroy it. The temperature that kills the tubercle bacterium will not only destroy the abortion bacillus, but also streptococci, *Bacillus enteritidis*, members of the colon group and other pathogenic bacteria that may get into the milk, with the exception of the spore bearers, such as anthrax.

The results of Dotterer and Breed of the Geneva Agricultural Experiment Station, soon to appear as Bulletin No. 412, are most instructive on the effect of pasteurization of whey on its bacterial flora.* The bulletin also contains valuable information relative to methods of pasteurization.†

The important question, however, is the minimum death point of tubercle bacteria. A careful analysis of the methods employed by those who have experimented on this point seems to show that a temperature of 140 degrees F. (60 degrees C.) for thirty minutes will kill these organisms, provided the milk is covered or properly agitated.* This does not give a sufficient margin of safety when the work is done by those who do not understand the importance of little details. It is believed, however, that with accurate methods it is not necessary to heat the milk higher than 140 degrees F. for thirty minutes. In order to be safe, the law in Denmark requires a momentary temperature of 80 degrees C.

*Milk that is properly pasteurized will have such disease-producing bacteria as those of tuberculosis, abortion, enteritis, etc., destroyed and also many of the lactic acid bacteria and other organisms in the normal flora. Pasteurization, however, will not kill *B. bulgaricus*, or spore-bearing bacteria such as that of anthrax, unless the milk is heated to a high temperature. There are also anaerobic spore-bearing bacilli in milk that will not be killed. If the pasteurized milk is cooled quickly to a low temperature, 45 degrees to 50 degrees F., the bacteria that remain alive in the milk will not multiply. If, however, the heated milk or whey is allowed to stand and cool at room temperature, *B. bulgaricus* will multiply very rapidly, so that after 18 to 24 hours the milk or whey becomes acid, and contains enormous numbers of this organism. The spore bearers and other living bacteria will also multiply.

†The methods that are in use for heating skim milk and whey are as follows: (1) By running a steam pipe into the vat through which the steam is admitted into the milk or whey, until it is raised to the desired temperature; (2) by a double jetting system; (3) by a Victor pasteurizer; (4) by flash pasteurization; and (5) by holding the heated milk.

*T. Smith has shown that if milk is not properly covered, tubercle bacteria will remain alive in the film that forms on the surface of milk when heated at a higher temperature.

(177 degrees F.). The four states in this country requiring pasteurization of dairy by-products have adopted the following temperatures: Pennsylvania, 178 degrees F.; Minnesota, 180 degrees F.; Iowa, 185 degrees F.; and Michigan, 185 degrees F. or 145 degrees F. for thirty minutes. They do not require the milk to be held at the higher temperatures.

The physiological effect of pasteurized or boiled milk is more difficult to determine. Again, the difference in the effect of the heat on whole and skim milk needs to be carefully investigated. The literature shows that if milk is not heated above 140 degrees F. (60 degrees C.) it is not changed in its physical or chemical properties, and I can find no reliable data to show that milk pasteurized at this temperature is not readily digested. The digestive troubles, if any, seem to come when the milk is improperly pasteurized or handled before feeding, or when it is heated to a higher temperature. If milk is to be pasteurized, the process must be complied with. This is not difficult to do, but it requires care and exactness. We should not criticise adversely a method from the results obtained by those who carry it out only in part. The information at hand shows that pasteurized milk can be fed with impunity. Henry and Morrison in their work on feeding state that "patrons of creameries should insist that all skim milk be pasteurized before it is returned to the farm. This precaution keeps the milk sweet and kills the disease-producing bacteria, thereby lessening the trouble from scours and preventing the possible introduction of tuberculosis."

Already at least fifty-five cheese factories are pasteurizing whey and forty-two butter factories or skimming stations are pasteurizing skim milk in this state.* So far as can be learned the patrons of these factories and creameries are pleased. The Geneva Experiment Station has pasteurized the milk for its calves for about ten years with excellent results. In two trials at the Ontario Agricultural College (1899) Dean found that calves fed pasteurized skim milk (heated to 160 degrees F.) made somewhat better gains than others fed unpasteurized skim milk. At the Kansas Station (Bulletin 126) Otis found practically no difference in the feeding value of pasteurized creamery skim milk and that fed directly from

*The 1915 list of the Department of Agriculture gives a total of 716 cheese factories, 234 butter and cheese factories, 290 butter factories and 29 skimming stations.

the hand separator, except that the pasteurized skim milk caused less trouble from scours. Dr. Way, of the Borden Condensed Milk Company, writes:

"We cannot advocate too strongly the efficient pasteurization of all skim milk and whey from milk plants, creameries and cheese factories, where this milk is to be fed to calves and hogs. We thoroughly believe that the future of our dairy herds from the standpoint of health depends largely upon this practice."

Dr. Marshall, State Veterinarian of Pennsylvania, writes:

"For a number of years we maintained a tuberculous herd of pure-bred cattle at the State Farm. The milk from these cows was pasteurized and fed to their calves. Our method of pasteurization was crude but effective; live steam was directed into the tank containing the milk until a uniform temperature of about 160 degrees F. was reached. Calves and pigs thrived on this milk and had no digestive disturbances which could be traced to the use of pasteurized milk.

"At the Pennsylvania State College they have been feeding pasteurized skim milk to calves for more than five years. Professor Larsen states that the calves were thrifty and no digestive troubles were experienced.

"About six years ago the owner of a pure-bred herd in Pennsylvania experienced trouble with tuberculosis in his calves but the mature animals were all free from the disease. Skim milk from a creamery was suspected of causing the trouble. The owner started to pasteurize the skim milk and had no further infections, and no digestive troubles were caused by the pasteurized milk. Other patrons of this creamery adopted the same course and finally equipped a creamery to pasteurize the milk before delivery."

Experiences of this nature are numerous.

There are those who believe the milk should be heated to the boiling point. The temperature insisted upon, from the sanitary point of view, is one necessary to destroy the disease-producing bacteria only. As already stated, by holding and agitating the milk or when these organisms are killed at a much lower temperature than they are when exposed to the heat for but a moment. Which of these methods leaves the milk or whey in a better condition for feeding must be determined by experience or accurately conducted experiments,

The important dietetic question arises when milk is boiled. Rosenau,* formerly of the Public Health and Marine Hospital Service, gives the following list of changes that take place when milk is heated to the boiling point:

Decomposition of the lecithin and nuclein.

Diminution of the organic phosphorus.

Increase of inorganic phosphorus.

Precipitation of the calcium and magnesium salts and the greater part of the phosphates.

Expulsion of the greater part of the carbon dioxide.

Caramelization or burning of a certain portion of the milk sugar (lactose), causing the brownish color.

Partial disarrangement of the normal emulsion and coalescence of some of the fat globules.

Coagulation of the serum albumin, which begins at 75 degrees C.

The casein is rendered less easy of coagulation by rennet, and is more slowly and imperfectly acted upon by pepsin and pancreatin.

Boiling gives the milk a "cooked" taste.

The cream does not rise well, if at all.

When the milk reaches about 60 degrees C., a scum forms on the surface which consists of:

Fatty matter	45.42
Casein and albuminoid	50.86
Ash	3.72

Milk heated in closed vessels does not form a pellicle even when the temperature reaches 100 degrees or 110 degrees C. Milk heated in the open air after cooling forms a pellicle on the surface which renews itself if it is removed. It seems that this pellicle is due mainly to the drying of the upper layer of the liquid. The cream probably does not rise well in heated milk, owing to the increase in the viscosity of the liquid in which it is emulsified.

Whether these changes modify its digestibility for calves to such an extent that it cannot be fed advantageously, must be determined by actual experience. There are conflicting reports on this topic. There is, however, a lack of good experimental data on feeding boiled milk to calves. Mr. Tuttle of the Briarcliff farm

*Pasteurization. Bulletin 56. Public Health and Marine Hospital Service, Washington, D. C.

writes that they have had good results from feeding boiled whole milk to calves after they are from seven to ten days old. Williams recommends boiled milk. Mr. Francisco of the Fairfield dairy writes to "boil the milk." The unfavorable dietetic effects of boiled milk do not appear to be fundamentally serious, otherwise the difficulty with it would be more uniformly reported. Undoubtedly all calves will not thrive on boiled milk; in fact some of them die when fed unheated milk. Williams, in a paper read at the Veterinary Conference at Ithaca, January 12, stated:

"In our experiment animals, and in some other experiments, we have studied the effect of boiled milk. In our own experiment herd, where the degree of infection in most individuals is slight or negative, our calves live well upon boiled milk, and their blood does not react. When we go into other herds however, and attempt to feed calves on boiled milk where parturition has been tardy and where the afterbirth has been retained, the calves very largely succumb to disease during the first few days. If, however, such a calf is started upon raw milk, even though it may be suspicious, and the precautions as to cleanliness above suggested are taken, the tendency to infection in the calf is less marked. The calf is more vigorous and healthy, and in time, according to the clinical observations, it tends to throw off and annul the comparatively small amount of infection which it has received. When the calf has reached eight to ten days of age, the infection may be further repressed by feeding the calf on sterilized milk, which at this age it bears with impunity."

If for economic or sanitary reasons it is found necessary to heat milk to a high temperature, some methods of satisfactorily modifying it will have to be found if it cannot be fed otherwise. It is more likely, however, that efficient means for holding the milk at a lower temperature, where changes that affect its dietetic action do not arise, but where the pathogenic bacteria are killed, will be worked out. If we are to save our calves from infection, we must be prepared to pay the price, which consists of extra labor and the introduction of definite and accurate methods for properly heating the milk. We cannot expect to solve all the problems connected with this great sanitary subject at one sitting. It has often taken years to find true answers to questions of less practical bearing than this.

The question has arisen relative to the pasteurization on the farm of the milk to be fed there. Several dairymen have suggested, and some of these have found from actual experience, that if the calves are allowed whole milk from their dams for from seven to ten days they can then be raised on boiled milk without trouble. The crux of this subject lies in the health of the herd. If it contains tuberculous animals or aborters, it is just as important that the milk be pasteurized, as if it comes from a creamery. Many herds are propagating their diseases because their raw milk is being fed to the calves.

The answer to the fourth question as to whether the diseases caused by raw milk are of greater significance than the labor and cost of pasteurization, should not be difficult. As already stated the annual loss from tuberculosis, white scours, pneumonia, and other diseases in calves, and abortion in cattle, due to infection from raw milk, is very heavy. All progress and the utilization of all preventive measures have their price, which must be paid in care, labor, money, or in all three. With many of our herds barely able to perpetuate themselves because of their diseases; with the extinction of many valuable strains threatened because of them; and with the possession of definite knowledge of the means by which these infections spread through the milk to other herds, are we justified longer in not living up to the knowledge that has been given us and in doing what we can to stop the destruction? Should we hesitate to expend a little money to adjust our methods in such a way that these heavy annual losses may be prevented and our cattle industries saved? Which is better for our dairymen and for the state, to pay a small amount directly for equipment and labor to prevent these diseases, or to sustain the losses caused by them? The cost to the state last year for foot and mouth disease contracted through unpasteurized milk alone, would pay for a suitable equipment for a large part of the creameries and factories in the state.

The number of cattle raisers who are voluntarily pasteurizing or boiling the milk fed to their calves, because by so doing they are obtaining better results, is increasing rapidly. This would tend to the conclusion that as an economic question it pays. Further, the heavy losses from disease among food-producing animals are having their effect upon the price of meat. The passing away of the ranges is forcing more and more our beef production within the influence of the dairy herd. Milk is one of the most valuable

foods that we possess, and further, it is among the cheapest. When our dairies are composed only of healthy cattle, and people are assured that the milk is safe, the quantity consumed will be wonderfully increased, with a corresponding reduction in the cost of living. This, like many other economic questions, will be settled eventually from experience. The choice of action is clear. We must do one of two things, namely, either prevent the diseases transmitted through the milk or bear the losses they occasion.

The question has been asked whether or not there is any other method than the pasteurization or boiling of milk to render it safe for feeding healthy calves. For the milk of infected herds, I believe not. If infected milk is to be utilized by feeding, it should first be rendered safe. There is at present no other safe method known for destroying pathogenic organisms in milk to be fed than by heat. With cattle, however, the only serious result of raw milk is the transmission of the germs of the diseases from which the cows themselves suffer. There seems to be little or no danger from the organisms that may be transmitted to them from the attendants through the milk. At present, therefore, we know of no reason why, for sanitary purposes, milk from perfectly healthy cows should be heated before being fed. When the herd is sound, its milk can be fed raw.* When all of the herds are healthy, mixed milk can be fed in the same way. The aim should be to build up sound herds, for it is the herd that forms the unit to deal with, whether in the sale of animals or in the use of their products.

I have tried to point out the essential elements of danger in the spread of infectious diseases through the use of raw milk from infected dairies, and the importance of adopting measures to prevent the perpetuation of such diseases. For the correction of the difficulties that have arisen there must be continued study, care, and patience. A large amount of experimental work will undoubtedly have to be done. The losses which our dairymen are now sustaining will disappear when they learn to care for their animals in such a way that the sources of infection naturally provided for the propagation of these diseases will be cut off.

*This does not apply to milk for human consumption. One of the essential reasons for pasteurization is to protect the consumer against the infection of the milk from attendants and those handling it who may be carriers of typhoid or other pathogenic bacteria.

APPENDIX

SHOWING THE RESULTS OF EXPERIMENTS ON THE THERMAL DEATH POINT OF
TUBERCLE BACTERIA

Author	Year	Temperature and Time	Results
de Man (g), 1.....	1893	60° C. (140° F.), 1 hr	Kills
Smith, T., 2.....	1899	60° C. (140° F.), 20 min.	Kills
Farrington & Russell, 3.....	1899	60° C. (140° F.), 60 min.	Kills
Russell & Hastings (a), 4.....	1900	60° C. (140° F.), 10 min.	Kills
Morgenroth, 5.....	1900	55° C. (131° F.), 3 hrs.	Kills
Hesse, 6.....	1900	60° C. (140° F.), 15-20 hrs	Kills
Hesse, 7.....	1901	60° C. (140° F.), 20 hrs.	Kills
Russell & Hastings (a), 8.....	1903	60° C. (140° F.), 15 hrs.	Kills
Hippins, 9.....	1905	60° C. (140° F.), 1 hr.	Kills
Freeman, 10.....	1907	60° C. (140° F.), 40 min.	Kills
Schroeder, 11.....	1910	60° C. (140° F.), 20 min.	Kills
Rosenau, 12.....	1910	60° C. (140° F.), 20 min.	Kills
Anderson & Rosenau, 13.....	1910	60° C. (140° F.), 20 min.	Kills
Freeman (b), 14.....	1910	60° C. (140° F.), 40 min.	Kills
Schorer & Rosenau, 25.....	1912	60° C. (140° F.), 20 min.	Kills
Bitter, 16.....	1890	68°-69° C., (153.5°-156.2° F.), 30 min.	Kills
Foster, 17.....	1892	70° C. (158° F.), 5-10 min	Kills
Freeman, 15.....	1898	68° C. (153.2° F.), 30 min.	Kills
Oppenheimer, 18.....	1899	70° C. (158° F.), 30 min.	Kills
Michigan Experiment Station, 19.....	1899	68.3° C. (155° F.), 20 min.	Kills
Farrington & Russell, 3.....	1899	68.3° C. (155° F.), 15-20 min	Kills
Morgenroth, 5.....	1900	70° C. (158° F.), 10-30 min.	Kills
Bang, 20.....	1901	65° C. (149° F.), 5 min.	Kills
Bang, 20.....	1901	70° C. (158° F.), Momentary	Kills
Marshall, 21.....	1901	68°-70° C. (153.5°-158° F.), 20 min.	Kills
Levy & Bruns, 22.....	1901	65°-70° C. (149°-158° F.), 15-20 min.	Kills
Bang & Stribolt, 23.....	1905	65° C. (149° F.), 5 min.	Kills
Schroeder, 11.....	1910	70° C. (158° F.), 10 min.	Kills
Schorer (b), 24.....	1912	62.77° C. (145° F.), 30 min.	Kills
Schorer & Rosenau, 25.....	1912	62-77° C (145° F.), 30-45 min.	Kills
Minnesota Bulletin, 26.....	1912	65° C. (149° F.), 20 min.	Kills
Denmark (c), 28.....	1898	85° C. (185° F.),	Kills
Hammond, 27.....	1900	71.1° C (160° F.), 15 min.	Kills
Morgenroth, 5.....	1900	100° C. (212° F.), 3-5 min.	Kills
Marshall, 21.....	1900	85° C. (185° F.), Momentary	Kills
Barthel & Stenström, 30.....	1901	80° C. (176° F.), Momentary	Kills
Bang, 20.....	1901	75° C. (167° F.), Mementary	Kills
Denmark (c), 28.....	1904	80° C. (176° F.), Momentary	Kills
Barthel & Stenström, 29.....	1904	80° C. (176° F.), 1 min.	Kills
de Jong, 31.....	1908	Milk must be sterilized or cooked.	
van der Sluis, 32.....	1909	80° C. (176° F.), Necessary	Kills
Minnesota Bulletin, 26.....	1912	80° C. (176° F.), 5 min.	Kills
Havner, 23.....	1913	77.4° C. (175° F.), 5 min.	Kills
Michigan Agric. Exp. Station, 19.....	1899	60° C. (140° F.), 10 min.	Did not kill
Russell & Hastings, 4.....	1900	60° C. (140° F.), 5 min.	Did not kill
Galtier, 34.....	1900	75° C. (167° F.), 20 min.	Did not yill
Galtier, 34.....	1900	85° C. (185° F.), 6 min.	Did not kill
Tjaden, Koske & Hertell, 36.....	1901	98° C. (208.4° F.), Momentary	Did not kill
Valagussa & Ortona, 37.....	1901	80° C. (176° F.), Exposure to	Did not kill

Author	Year	Temperature and Time	Results
Morgenroth, 5	1901	55° C. (131° F.), 2 hrs.	Did not kill
Bang, 20	1901	60° C. (140° F.), 15 min.	Did not kill
Barthel & Stenström (e), 38....	1901	65° C. (149° F.), 20 min.	Did not Kill
Rullmann (f), 39.....	1903	65° C. (149° F.), 30 min.	Did not Kill

(a) Milk covered and agitated during heating process.

(b) Milk covered during heating process.

(c) The Denmark law was revised in 1903 and again in 1904 by requiring the products to be heated to 80° C., and adding to these cream used for the manufacture of export butter. The law also requires a pasteurization of 80° on milk and buttermilk to be imported.

(d) Milk not covered or agitated during heating process.

(e) The milk was from udders in last stage of disease and had suffered great physical and chemical changes.

(f) Was agitated constantly during pasteurization.

(g) The standard temperatures that have been most commonly accepted up to the present time (1900) are those of de Man (*Arch. f. Hyg.*, 1893), who worked with broken-down semi-fluid cheesy matter derived from tuberculous udders. They are 55° C. (131° F.) for 4 hours, 60° C. (140° F.) for 1 hour, 65° C. (149° F.) for 15 minutes, 70° C. (158° F.) for 10 minutes, 80° C. (176° F.) for 5 minutes, 90° C. (194° F.) for 2 minutes, and 95° C. (203° F.) for 1 minute.

REFERENCES

1. DE MAN. *Arch. f. Hyg.* Bd. XVIII (1893), p. 33.
2. SMITH, T. *Jour. Exp. Med.* Vol. IV (1899), p. 217.
3. FARRINGTON & RUSSELL. *Wis. Sta. Rpt.* (1899), p. 122.
4. RUSSELL & HASTINGS. *Wis. Sta. Rpt.* (1900), p. 147.
5. MORGENROTH. *Hyg. Rundschau.* Bd. X (1900), p. 865.
6. HESSE. *Zeitschr. f. Hyg.* Bd. XXXIV (1900), p. 347.
7. HESSE. *Zeitschr. Thiermed.* Bd. V (1901), p. 321.
8. RUSSELL & HASTINGS. *Rev. Gén. Lait.* Vol. III (1903), p. 34.
9. HIPPINS. *Jahrb. f. Kinderh.* Bd. LXI (1905), p. 365.
10. FREEMAN. *Jour. Am. Med. Assn.* Vol. XLIX (1907), p. 1740.
11. SCHROEDER. *U. S. Dept. Agric., B. A. I.* Cir. 153.
12. ROSENAU. *U. S. Dept. Agric., B. A. I.* Cir. 153.
13. ANDERSON & ROSENAU. *Pub. Health and Mar. Hosp. Serv., U. S. Hyg. Lab. Bull.* 57.
14. FREEMAN. *Jour. Amer. Med. Assn.* Vol. LIV, (1910), p. 372.
15. FREEMAN. *Arch. Pediat.* N. Y. Bd. XV (1898), p. 514.
16. BITTER. *ZEITSCHR. f. Hyg.* Bd. VIII (1890), p. 255.
17. FOSTER. *Hyg. Rundschau.* Bd. II (1892), p. 872.
18. OPPENHEIMER. *Munch. Med. Wochenschr.* Bd. XLVI (1892), p. 1462.
19. MICHIGAN EXP. STATION. *U. S. Dept. Agric. Farmer's Bulletin* 107.
20. BANG. *Malkeritid.* Vol. XIV (1901), p. 677.
21. MARSHALL. *Mich. Sta. Bull.* 184, p. 207.
22. LEVY & BRUNS. *Hyg. Rundschau.* Bd. XI (1901), p. 669.
23. BANG & STRIBOLT. *Rev. Gén. Lait.* Vol. IV, (1905), p. 361.
24. SCHORER. *Science, n. ser.* Vol. XXXV (1912), p. 222.
25. SCHORER & ROSENAU. *Jour. Med. Research.* Vol. XXVI (1912), p. 127.
26. MINNESOTA BULLETIN. *Minn. Extension Bull.* No. 32.
27. HAMMOND. *Ontario Agric. Col. and Exp. Farm Rep.* (1900).
28. DENMARK. *Hyg. Lab. Bull.* No. 56.
29. BARTHEL & STENSTRÖM. *Rev. Gén. Lait.* Vol. IV (1904), No. 5, p. 97.
30. BARTHEL & STENSTRÖM. *Centralb. f. Bakt. u. Par.* Bd. XXX, Abt. I (1901), p. 429.
31. DE JONG. *Milchu, Zentbl.* Bd. IV, (1908), p. 13.
32. VAN DER SLUIS. *Inaug. Diss. Univ. Bern.* (1909), p. 34.
33. HAVNER. *Penn. Sta. Col. Bul.* 123.
34. GALTIER. *Jour. Med. Vet. et Zootech.* Vol. IV (1900), p. 1.
35. KROMPECHER. *Ann. Inst. Pasteur.* Vol. XIV (1900), p. 723.
36. TJADEN, KOSKE & HERTEL. *Arb. K. Gesundheitsamte.* Bd. XVIII (1901), p. 219.
37. VALAGUSSA & ORTONA. *Abs. in Nature.* Vol. LXIII (1901), p. 404.
38. BARTHEL & STENSTRÖM. *Centralb. f. Bakt. u. Par.* Abt. I, Vol. XXX, p. 429.
39. RULLMANN. *Rev. Gén. Lait.* Vol. III (1903), p. 15.

PRESERVATION AND IN SITU FIXATION OF VETERINARY ANATOMICAL SUBJECTS BY INTRAVASCULAR INJECTION

F. A. LAMBERT, D.V.M.

Assistant Professor of Comparative Anatomy, College of Veterinary Medicine,
Ohio State University, Columbus, Ohio.

Although *in situ* fixation of anatomical material by intravascular injection has been well established in some few veterinary colleges in this country for more than a decade, nothing relative to the history, technique or advantages of the method has appeared in our periodical literature. This fact and numerous inquiries regarding the technique have prompted the writer to deal with this subject somewhat in detail in the hope that the same may be of value to those more directly concerned and of interest to those in our profession whose vivid memories of the dissecting room are of "soft" material only.

Although the writer has personally supervised the injection of approximately 150 horses, 30 dogs, 12 cows, 12 sheep and 10 pigs during the past six years, he assumes no credit whatsoever for the method, the same having been well established in this department even before his matriculation as a freshman.

It is universally accepted, I believe, that gross anatomy is one of the most important, if not the most important, of the foundation subjects in veterinary education. *In situ* fixation by intravascular injection has not only revolutionized our knowledge of some parts of this subject but it has made possible a much more nearly ideal method of teaching the same. The history of affairs in human anatomy was identical in this respect.

For convenience as well as clearness the writer desires to treat the subject under the following divisions: history, equipment, technique and advantages of the method.

HISTORY: In the fall of 1901, Professor Septimus Sisson came to the College of Veterinary Medicine, Ohio State University, to fill the chair in gross anatomy. Having received his undergraduate anatomical training in the Ontario Veterinary College on "soft" material and having later demonstrated for eight years on the same in that institution, he was quite familiar with the many disadvantages of using non-preserved or unfixed cadavers in the dissecting

room. Since intravascular injection for fixation and preservation was then being used in some medical colleges and had been used by Dr. Sisson very successfully on the smaller animals in the Kansas State Agricultural College in 1889 and 1900, he determined to try the same method, using formalin, on the large animals. So successful was he on horses and so satisfactory were the results, to both instructor and students, that the method was perfected and adopted as the regular practice for the preparation of all animals used for dissection and for frozen sections. From time to time this practice, modified somewhat in some cases, has been adopted in most of our veterinary colleges.

EQUIPMENT: To carry out the method with which the writer is most familiar and which he believes most satisfactory, one will find it necessary to have the following equipment or its equivalent: One set of English hobbles; two large scalpels; two pairs of large hemostats; one pair scissors; one cannula ($\frac{1}{4}$ inch for horse) preferably with an "olive" at each end; three feet of heavy cord (chalk line); one "head" chain; one "rump" chain; two one-half ton chain hoists; rings in the ceiling or an overhead track for suspension; one large needle; one large (20 gallon) galvanized iron tank with pipe leading down to the embalming room equipped with a small hose cock; rubber hose ($\frac{1}{4}$ inch) sufficient to reach from end of the pipe to the subject; two boards notched with a V at each end, to be used as spreaders for the limbs.

Most of the equipment is shown in the accompanying figures and reference to these will enable the reader readily to understand the technique.

TECHNIQUE: The following is the procedure indicated for the injection of the horse and the necessary modifications for the other animals will be mentioned thereafter.

It has been the practice of the writer to first prepare the fluid to be used for the preservation and fixation. Twenty gallons of a fifteen per cent. solution of formalin are usually made up in the tank. Good results are obtained in favorable weather from the use of a ten per cent. solution and in some cases where distribution was excellent a five per cent. solution gave very satisfactory results. In some cases where subjects were to be used for a long period during hot weather a twenty per cent. solution was used.

Stand the subject near a drain in the embalming room; put on a strong halter and the English hobbles (king hopple on the right

thoracic digit). It is desirable when casting on cement floor to have three persons if possible; one holding the head "close", one directly behind the animal, and a third to gently "take up" the hopple chain. In this manner the animal can usually be made to "sit down", from which posture the desired recumbent position is easily secured by pushing him over on his *left* side. The writer has tried casting on a truck or other methods but none has proven so satisfactory as the above, which in one hundred and fifty cases has led

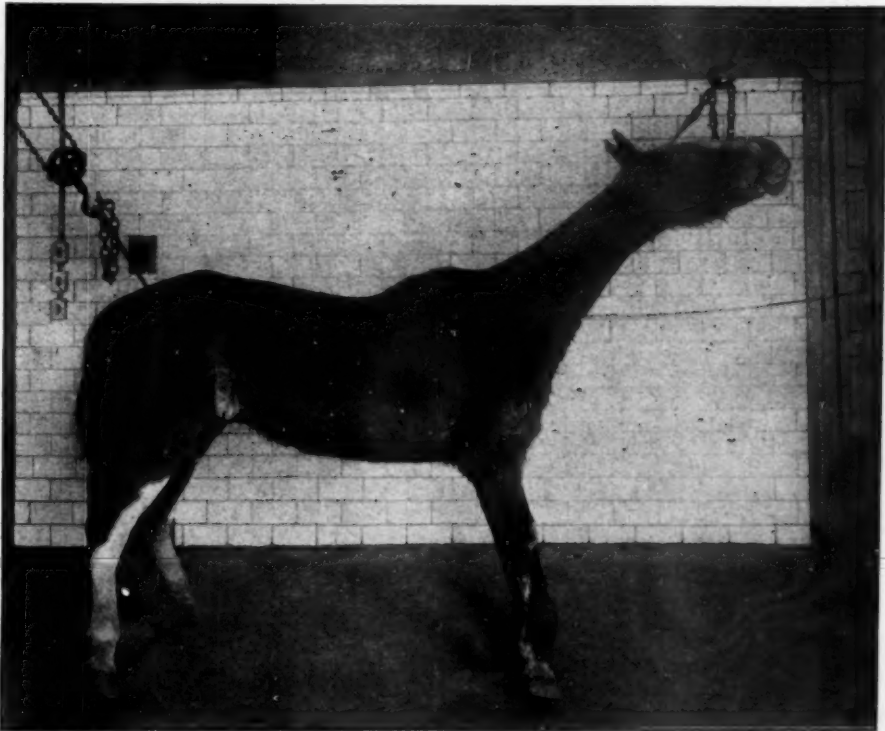


FIG. 1. Showing the method of suspension, the chain hoists, the angles at which they are placed, the "head" and "rump" chains, the limb spreaders, the incision to reach the carotid artery, the cannula and the rubber tube extending to same.

to no accidents. With the four feet drawn closely together and secured and an assistant on the head, the operator takes his position on the dorso-lateral aspect of the neck.

In the posterior half of the jugular furrow make a longitudinal incision about four inches in length through the skin and cutaneous colli muscle. This will expose the jugular vein which is, of course,

to be avoided by pushing to one side. Locate the carotid artery and separate it from the connective tissue and adjacent nerves, avoiding damage to the latter and to any small collateral arteries present. Draw the artery to a more superficial position in the opening and apply the two large hemostats to it about three inches apart. With a sharp scalpel make an incision one and one-half inches long on the superficial aspect of the artery. Removal of the two forceps allows the free bleeding of the animal. In order to avoid clogging of the drain by the coagulation of the blood it is advised to have water running on the floor from a hose close to the carotid incision. As bleeding proceeds the animal is usually inclined to struggle more or less which in turn induces more complete bleeding. In cases where a low vitality is apparent and probability of a thorough bleeding is doubtful, a hypodermic of strychnia may be given just previous to casting. The general stimulant increases heart action and usually ensures satisfactory exsanguination.

Casting the subject on the left side and using the *right* carotid artery for bleeding and injection is preferable in order that the relations of the oesophagus be not disturbed.

As soon as the animal is dead, the head and the rump chains are to be placed, viz: The two hooks on the head chain, which is Y shaped, are to be passed from above downward and outward in the temporal fossa under the zygomatic arch on either side of the head; and the rump chain, provided with one large hook is placed under the last sacral segment. In order to insert the hooks a small incision through only the skin and deep fascia is necessary.

Connect the lower hooks of the chain hoists with the head and rump chains respectively and proceed to raise the animal to a position as nearly in imitation of the standing posture as is possible. With the board "spreaders" placed to separate the limbs (as shown in Fig. 1) the four digits should just touch the floor. The limbs are spread to facilitate the dissection of the pectoral and medial femoral muscles. If, however, the subject is to be used for frozen section work or for special topographic purposes it is no doubt preferable to have them in as near normal standing position as is possible. Suspension in imitation of the natural standing position, is in the writer's judgment, preferable to fixation on the back or on the side, as practiced by some. Too much distortion and flattening of the muscles occurs in the latter positions. The writer quite successfully hardened one horse with the head in flexion by suspending with three hoists, the third being fixed at the withers.

Connect one end of the rubber tubing to the hose cock on the end of the fluid pipe and the other to the cannula, applying strong ligatures about both. Turn on the fluid sufficiently to fill the horse, forcing the air out of the latter and also to determine accurately how far the valve should be opened to permit only a very small but constant stream to pass through the hose. Insert the cannula into the carotid artery through the incision previously made directing the former toward the heart. Securely ligate the artery about the cannula and also ligate the artery just in front of the incision.

Open the valve in the fluid pipe only enough to allow a small stream to gravitate into the subject. Very undesirable results have been obtained in a few cases where an assistant turned the valve entirely open, causing too great a pressure in the vessels with a rupture into the lungs, evidenced by fluid running out of the nostrils and mouth before the tissues were filled. The tank the writer uses is placed on the second floor above the embalming room (approximately twenty feet) which distance gives considerably more gravity pressure than is necessary. A height of eight feet should be sufficient.

As soon as the injection is started it is advisable to see that the tongue is in its normal position and to fasten the lips together by one stitch through the center of each. The mouth may be hardened partially opened, if desired, by placing a small two-inch block between the incisor teeth.

While the fluid gravitates into the subject, the operator should *constantly* observe the distribution of the fluid as determined at first by the twitching of the various muscles and later by the pressure in the larger veins—jugular, facial, cephalic, external thoracic and saphenous. These indices should be noted often and whenever an appreciably great distention of the same occurs, the fluid should be turned off temporarily. Otherwise a pulmonary rupture is quite probable, for in the type of horses used for anatomical work pulmonary emphysema and other like conditions are quite common.

Good distribution rather than mere amount of the injection is more to be desired. Usually the fixation or contraction of the muscles takes place first in the withers, prescapular region and thoracic limb, followed by either the head and poll or the pelvic limb. Palpation of the tongue may be used as an index as to the fixation of the head, for it has been the writer's observation that

in older subjects the muscles of the cheeks, nostrils and lips are often rather slow in hardening. Usually in the heavy musculature of the thigh, especially the biceps, semi-tendinosus and semi-membranosus, distribution and fixation are slow to completion.

While the distribution and fixation are being determined on the subject, the amount of the injection can be noted on a gauge within the view of the operator. Its construction is simple—a light chain extends from a float block within the tank up over a pulley and then down into the embalming room, a small weight on the bottom of the chain is raised as the fluid gravitates into the subject. If mathematics fail one in figuring out the scale, empiricism may be employed by drawing out a gallon at a time and marking the gauge accordingly.

When a pulmonary rupture occurs the operator may safely assume that no further injection of any value is possible. To prevent this accident it is advisable not to continue the injection until the fluid is seen to escape through the nostrils or mouth or both, if the arteries are to be later filled with a colored mass injection for the study of angiology or topographic anatomy. In such cases it is advisable to discontinue the gravitation of the fluid when distribution and hardening are satisfactory and the amount of the injection is sufficient to insure preservation. Otherwise the fluid may be shut off permanently when in the operator's judgment the animal is completely embalmed.

Our experience has shown that it is inadvisable to disturb or work on the subject in less than twenty-four hours after the injection is completed. Two to four days are even better. If the subject is not to be used for a week or more it is advisable to wrap the face and the limbs below the carpus and tarsus with moist towels or sacks to prevent drying, since here the subcutaneous structures contain a minimum of moisture. Continuance of the same until the student comes to the dissection of these parts is a good practice.

The following table gives a record of thirty-four horses injected by the writer and used for dissection in the Ohio State University:

ANIMAL	WEIGHT (estimated)	AMOUNT OF INJECTION
1—Black mare	800 lbs.	13 gals.
2—Bay mare	750	11
3—Gray mare	800	12.5
4—White gelding	1000	16
5—Black gelding	800	13.5
6—White mare	1050	17
7—Sorrel mare	900	15
8—Black mare	900	15
9—Sorrel gelding	1050	17.5
10—Bay pony mare	800	10
11—Black mare	1250	20
12—Bay gelding	1050	17
13—Black gelding	1250	22
14—Sorrel mare	1050	17.5
15—Black gelding	1100	17
16—Tan pony mare	800	16
17—Bay gelding	1150	16
18—Sorrel mare (2 yr. old)	750	22
19—White gelding	1350	21
20—Bay gelding	1350	17
21—Tan mare	700	11
22—Black mare	950	7
23—Black gelding	1100	14.5
24—Sorrel mare	1000	16
25—Black gelding	900	11
26—Gray gelding	800	11
27—Bay pony mare	600	9
28—Sorrel mare	900	15
29—Brown mare	800	10.5
30—Black gelding	800	14.5
31—Gray gelding	1100	26.5*
32—Sorrel gelding	700	10
33—Bay pony mare	550	7.5
34—Sorrel gelding	750	11.5

*Number 31—Gray gelding, had a rupture of a blood vessel during injection resulting in the escape of approximately four or five gallons of the fluid into the pleural cavity.

From the above table the average weight of the subjects used is found to be about 925 lbs., and the average amount of fluid injected 14.5 gallons or approximately 1.5 gallons per hundred weight. To make up 14.5 gallons of 15 per cent. formalin solution 2.175 gallons of commercial formalin are required, which at \$.90 per gallon gives us the cost of injection per average head—\$1.95.

In the preparation of the other animals the writer wishes to briefly state that the same technique is followed out with certain minor modifications. The ox is cast with the single rope method and embalmed standing, a rope around the horns being used in preference to the head chain, whenever possible. It has been our practice to use the femoral artery rather than the carotid for the bleeding and injection of the smaller animals—sheep, dog or hog. As soon as bled these animals are placed in a 90° trough, properly

padded in each case to prevent distortion and flattening, and in this position injected.

Not infrequently it has been our practice to make special preparation of certain organs *previous* to the intravascular injection and *in situ* fixation. To distend the stomach in the horse or dog a 5 per cent. solution of formalin is permitted to gravitate into the organ by means of the rubber tubing being passed per os into the oesophagus. The same is sometimes done in the ox to prevent post-mortem fermentation of stomach contents. To demonstrate the more nearly normal size and relations of the lungs a rather thick aqueous solution of corn starch is gravitated by means of a tube passed far down the trachea through a tracheotomy incision in the usual location, or the tube may be passed per os through the aditus laryngis. A common irrigating can and tube are very satisfactory for this particular work.

To prepare the blood vessels for topography or for angiology the arteries alone need to be injected since the veins retain enough blood or enough discoloration to make them easily located. The material we use for the injection of the arteries is an aqueous solution of corn starch (two lbs. to the gallon) thoroughly stirred and dry red oxide of lead added until the desired color is obtained. For one subject a three gallon quantity is mixed and the average amount used may be estimated at slightly over two gallons. The injection of the red mass is most satisfactory about twenty-four hours after the intravascular injection of the formalin. By that time the pressure in the arteries has subsided and much less resistance to the passage of the mass is encountered. Reference to Figure 2 will adequately explain the equipment used in this procedure.

The pump is an Allen's Rotary Surgical Pump, which forces a slow and small stream. An assistant should constantly stir the mass to prevent the starch setting in the container. To secure the most satisfactory results the operator must force only a very small but constant stream into the vessels. To attempt rapid injection results often in a rupture either into the lung or into the pleural cavity. To use the pump intermittently often results in the starch setting in the hose or in the carotid artery preventing further injection in some cases. If after the injection of the red mass is begun, a distention of the veins occurs as a result of the formalin solution being forced over from the arteries, one may perform

phlebotomy on the jugular, cephalic, external thoracic and saphenous veins to lessen the back pressure in the arteries. When successful in the use of the red mass injection even very small arteries, the size of a thread, are well brought out. The starch and red lead mass are, in our judgment preferable to others, for soon after injection it becomes almost solid and when cut into offers no resis-

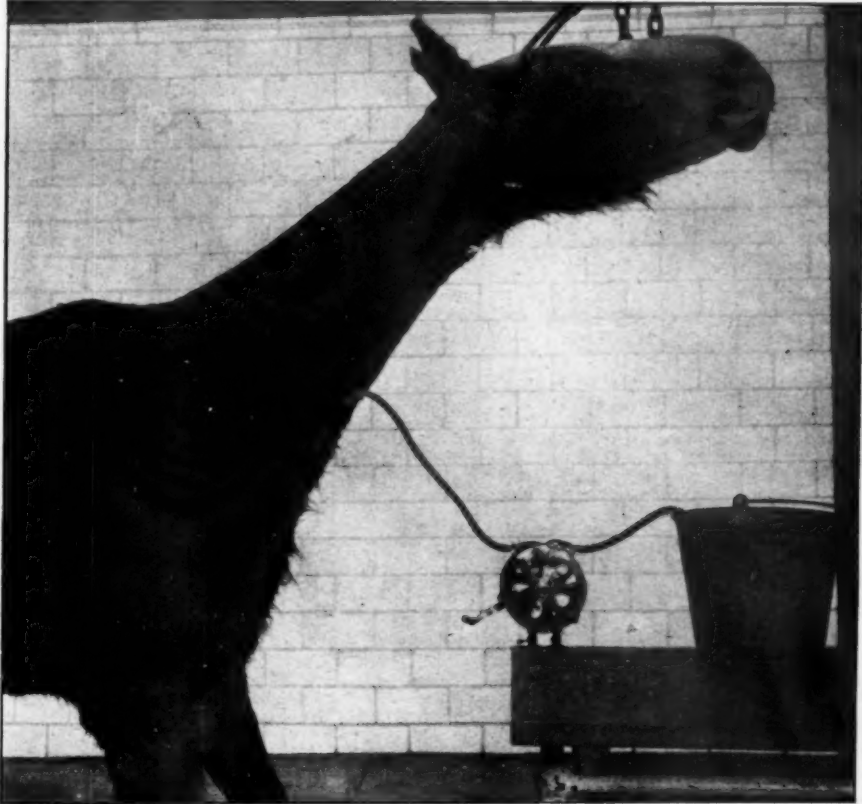


FIG. 2.

tance to the knife, nor does it diffuse into or stain the tissues. The insolubility of the red lead makes it preferable to carmine or other substances used to secure the color.

ADVANTAGES... The advantages of preservation and *in situ* fixation of veterinary anatomical material are manifold to the anatomist, student and the profession alike. Since the writer has never had experience in the dissection of non-preserved subjects, he has made numerous inquiries of men older in the profession, whose

undergraduate anatomical training was on "soft" material and whose opportunity it has since been to observe the present teaching methods and dissecting room material made possible by preservation and fixation. From these men the writer has received sufficient information, he believes, to permit his making some comparisons, which are not superfluous when we realize that there still exist in veterinary educational circles a few loyal advocates of "soft" material.

At a banquet, recently, one of our most prominent and most widely known teachers of veterinary medicine gave the following brief summary of his experience in the dissecting room:—"When I was in school we did not have the advantages of embalmed subjects in anatomy. We dissected only during cold weather and even then our dissection was the most rapid thing of that age. We brought a cheap horse into the laboratory, bled him, and after placing him on a large table went to work. Since economy was the keynote in practically all veterinary education at that time, we were required to remove the skin which the college sold. A retention of the abdominal viscera meant an extremely rapid decomposition, so we made hasty dissection of the abdominal wall and eviscerated the animal. Removal of the skin and viscera required the entire first dissection period and since the subject was in an advanced stage of decomposition by the end of the first week, we had only four or five laboratory sessions for a dissection. While few of us got very far in anatomy, a multitude of horse skimmers was developed."

It is the writer's belief that an enumeration, with a minimum of discussion, of the advantages of preservation and fixation is sufficient, since those now opposed to the same are decidedly in the minority.

To the student, this material offers an opportunity to make uniformly accurate, thorough and complete dissection and study of *every* part of the subject, for no time and limit is fixed by the decomposition of the tissues. It permits dissection in the laboratory heated to a comfortable temperature in the winter and a properly preserved subject may be kept for a long period during the extremely hot weather of mid-summer. An advantage is here noted over the material offered for the dissection of man, since one need not take animals after death, but before. It further permits dissection during the full academic year, and although the *average*

regular time for a part is about five weeks it is true that the first assignment for freshmen extends over seven weeks, often.

Considering the sanitary phase, one may say that proper preservation reduces to a minimum the opportunity for infection in the anatomical laboratory. In nine years observation the writer has not seen a single infection from material prepared as above described. It precludes the possibility of the offensive odor of decomposition and the inhalation of the ever-present poisonous gases from non-preserved material.

To express the point of view of the anatomist and scientist, the writer desires to quote from the preface of the first edition of, "A Text Book of Veterinary Anatomy," by Septimus Sisson:—"The study of frozen sections and of material which has been hardened by intravascular injection of formalin has profoundly modified our views concerning the natural shape of many of the viscera and has rendered possible much greater precision in topographic statements. The experience of the author during the last ten years, in which almost all material used for dissection and for frozen sections in the anatomical laboratory of this university has been hardened with formalin, has demonstrated that many of the current descriptions of the organs in animals contain the same sort of errors as those which prevailed in regard to similar structures in man previous to the adoption of modern methods of preparation."

In closing the writer desires to express his indebtedness to his former teacher and colleague, Professor Sisson, for training received in the subject discussed and for the two photographs from which the above views were made.

An outbreak of trichinosis occurred in Far Rockaway Borough of Queens in April, which was remarkable in that the mortality was very high for this disease and that the diagnosis was for sometime obscure. Twelve patients were treated, everything being done for them therapeutically, that was possible, but four of them died, a mortality of 33 1/3%.

The source of the infection appears to have been a pig slaughtered about January 1. The exact method of preparing the food is not clear, but cooking played a very small part in it.—*Bulletin of the Department of Health, New York City.*

VETERINARY FACULTIES AND STATE EXAMINING BOARDS*

S. STEWART, Kansas City, Mo.

The attendance at our New York meeting was the greatest numerically in the history of this organization, and the number of College Faculties, also the number of State Boards represented, exceeded that of any previous meeting. The records show that 13 College Faculties out of a total of 23, and 21 State Examining Boards, out of a total of 36, participated in the session of that meeting. This majority representation and participation cannot but be looked upon as substantial evidence of the wide-spread interest in the work before us, and affords the assurance of the intrinsic merits of our purpose, and an early solution of some of the pressing problems.

During the past two years there have been few changes in the directing officers of the several veterinary colleges. Quite in contrast to this there have been many changes in the personnel of the State Examining Boards. Of the 36 boards established at the time of our meeting, 4 have been entirely changed in membership, while in 20 of them the membership has been changed in greater or less proportion. Four new state boards have been organized since our meeting, and it appears that all of those charged with the responsibility of determining the fitness of candidates for license to practice, about one-half of them had no experience previous to two years ago, and some of them have yet to officially take up the work before them. If this record is to serve us as a criterion of what to expect in the future, then it must be very evident that if some degree of uniformity shall be maintained, and some progress made from year to year, it is high time that we correlate the work already done and crystallize it into definite form, also see to it that it is published, that the various board members may have a reference which is dependable, and become familiar with that which has heretofore been accomplished. If the experience and records of the various state boards can be gathered together and arranged in definite form, data will be thus supplied of incalculable value in the cause of better veterinary education.

*Address of the President of the Association of Veterinary Faculties and State Examining Boards of North America, Sept. 1915, Oakland, Cal.

As the result of a personal correspondence with the officers of the various State Boards of Examiners, I have no hesitation in affirming that state boards generally, will be very glad indeed to avail themselves of reliable data concerning the findings of other boards, and would be glad to adopt the methods of other boards which experience has proven to secure the best results; which has provided a satisfactory manner of determining whether a candidate for license to practice really possesses the kind and degree of knowledge which will make him a useful member of the profession.

The final judges as to whether or not the graduates of our colleges have been sufficiently trained before they are granted a veterinary degree, are the members of the various State Examining Boards, hence if the examining boards can establish a substantially uniform examination, and a practically uniform method of graduation, the colleges will have some general guide and will most certainly be stimulated to correct any defects, and to supply any omissions in the courses of instruction given therein.

During the last meeting, and in compliance with a resolution, a committee was appointed for the special purpose of collecting data relative to the variability of state board examinations, and as to the successes and failures of candidates appearing for license to practice before the various state boards. It was the opinion expressed that if this data indicated also the colleges from which the successful and unsuccessful candidates were graduated, with the dates of graduation, that the information would be of material value to the colleges, serving as a guide to make the instruction include subjects which State Board Examiners deemed of material importance to those who should be granted a license to practice.

The personnel of the committee above referred to consists of: O. L. Boor, Secretary of the Indiana State Board; J. T. Seeley, President of the Washington State Board; E. W. Babson, Secretary of the Massachusetts State Board; Thos. Downing, President of the Iowa State Board, and M. Jacobs, Secretary of the Tennessee State Board. This committee, made up entirely of members of State Examining Boards, have the personal relationship and wide experience which should enable them to bring to this meeting much well digested material for our consideration, and I have no doubt will be able to establish some standards which will serve to guide us in our further work, each in his own particular field. Those who attended the New York meeting could not but be impressed with the virile

quality of the papers presented, and by the animated and intelligent discussion given to each of them as presented. The report of said meeting as incorporated in the 1913 annual report of the A. V. M. A. is a splendid commentary on the most excellent service rendered by our secretary, Jacob Helmer. The discussions were quite extensive and the careful editing of the same has made this printed report of permanent value. Should there be any member of this organization who is not a member of the A. V. M. A., and not in possession of the report of that organization for 1913, I advise that he procure a copy of said report from the association's librarian, for the advantages which will come to him through securing the portion relating to this organization. The expense of procuring bound separates of that portion of the A. V. M. A. report of this meeting relating to this organization, in numbers sufficient to meet our needs, will not be large, and I recommend that the secretary be instructed this year to arrange for same. There are probably not more than 150 members of state boards who are not members of the A. V. M. A. and who may not desire to purchase copies of the report of that organization, but who would gladly read the report of our doings that they might be better informed concerning the problems before this organization. It is better for the cause to supply every member in this manner, and thus make his cooperation on the basis of fullest information.

Enterprising publishers have been on the lookout for copies of state board examinations, with the view of supplying applicants for state license with lists of questions and answers thereto. Several members of this organization expressed themselves adversely, last meeting, to supplying such list of questions, but since our meeting there has appeared on the market a volume of 395 pages issued from the press of J. B. Lippincott Company, and in the preface of this book the reader is led to understand that it represents the scope of State Examiners' questions, as well as supplying acceptable answers thereto. Further, it purports to furnish students a compendium on the several branches which they are studying in college, and to supply applicants for license to practice the information whereby they may make adequate preparation to pass state board examinations, yes, even more, it suggests that the volume might serve as an encyclopedia of veterinary knowledge for the busy practitioner.

While the author modestly disclaims perfection in the text, and asks for suggestions that subsequent editions of this work may be more valuable, it is not quite clear how said author can absolve him-

self from responsibility for the numerous errors contained therein. A careful scrutiny of the answers supplied to the various questions reveals the fact that many are faulty and some are erroneous. The student or practitioner who makes use of the same cannot but be led astray in many places. It is very easy for one to imagine that a man, out of college for a number of years and who has not been a careful student of veterinary medicine since leaving college, might read the answers given and not be impressed that they were seriously awry anywhere, but those, who have kept abreast of the times and who are familiar with some of the subjects under consideration will readily observe the faulty and misleading statements made. They will appreciate how far astray the student or practitioner might be led through the inaccuracy of many of the answers. Certain it is that State Board Examiners should be more critical than have been the authors of the answers found in this book.

Again, the student and the graduate preparing for examination will have reason to believe that the question found in this book represent the scope of any examination with which such person is likely to be confronted, and this fact must make very plain to you, that an adequate examination must be wider than a written examination embodying such questions. During the meetings heretofore the problem has been presented, time and again, relative to the making of examinations broad in scope as well as practical in character. Such examinations should include tests or detailed descriptions of tests for disease, as applied to the living animal, to also include the identification of materials to be used. The usual adverse argument has been that State Board Examiners could not afford to take the time for, nor incur the expense of practical examinations.

In states where a comparatively large number of applicants, for license to practice, appear at each meeting of the board, it is very evident that more time will be required to make a practical examination than is now consumed in a purely written one. When the number is large, then the return in fees is proportionately large, and it would seem as though the interests of the state being served by a board would not only warrant, but demand that additional time and expense be incurred for this service. If there be but a small number of applicants, then the extra time required is very limited indeed, and the practical features of an examination would be a small tax upon both time and funds. For instance, if there were but 10 applicants, only a few hours need be consumed in an additional prac-

tical examination, and certainly there could be no large expenditure for facilities for such examination. A board could arrange for the use of a variety of animals at a nominal cost, and members could easily, from their own equipment, supply needful apparatus and materials to make practical tests of the knowledge of applicants, along a number of lines. Specimens of commonly used therapeutic agents could be employed to ascertain whether or not they are recognized readily and to make positive the applicant's knowledge of how to properly use the same. Why should not the board require an applicant to demonstrate how to examine an animal for specified diseases; how to conduct a clinical diagnosis, as for instance, for cardiac or pulmonary diseases; to manifest actual knowledge of anatomy by pointing out the position of specific structures; to decide whether or not an animal examined presented normal or abnormal conditions and state the basis of decision? In fact why should not the board really ascertain whether or not applicants have a workable knowledge and may be safely trusted by owners of live stock, in matters veterinary?

We are assembled to accomplish, if possible, a definite object, the establishment of a uniform or nearly uniform examination for licenses to practice Veterinary Medicine and Surgery. In previous meetings, it has been pretty thoroughly set forth through the papers presented and discussions thereon, that if this can be accomplished there will be little to interfere with the right of the licensed practitioner enjoying the privileges of his profession in any part of this great country, without being obliged to establish anew his fitness when conditions make it essential or desirable for him to live in another state, or successively, several other states. While reciprocity between state boards is the object sought, incidentally the cause of veterinary education is involved, and any standard of examination established by the combined state boards must necessarily become a standard by which veterinary colleges will be guided. The colleges must prepare their students to meet this standard or lose the confidence of their supporters.

Any standard fixed by this body will determine the minimum in scope and practicability of veterinary instruction, hence it is very easy to understand the influence our deliberation and action or non-action will have over an advance upward in veterinary education. I sincerely trust this, the twenty-first anniversary meeting, will establish a new and glorious record for things accomplished in advancing the veterinary profession.

CLINICAL AND CASE REPORTS

REMOVAL OF THE NASAL SEPTUM

H. E. BEMIS, Ames, Iowa.

In the interest of new and better surgical methods, I should like to report upon a method of removing the nasal septum in the horse which has been used by us during the last two years with success in three clinical cases and several experimental cases. I should like to urge others to try it so that we may get reports upon a large number of cases in a shorter time.

The operation is as follows: Secure the animal upon an operating table, perform tracheotomy, and anaesthetize. Thoroughly shave and prepare the nasal region from the lower boundary of the frontal sinus downward. Trephine upon the median line at a point where the fingers begin to diverge from each other when passed from below upward over the nasal bones. This point marks the lower limit of the turbinal portion of the frontal sinus and will be found to be almost exactly at the same height as the posterior border of hard palate which is the best height at which to cut the nasal septum transversely. Be careful at this time to trephine the bone only, without wounding the mucous membrane and the accompanying submucous artery which if wounded results in disagreeable hemorrhage. Trephine a second time on the median line about 5 to 7 cm. below the first one and remove the plate of bone between the two. Pack the nostrils with gauze saturated with adrenalin chloride 1-3000 or paint the septum with the same. Inasmuch as the vessels of the septum are chiefly in the mucosa and submucosa they can be markedly constricted by a surface application of adrenalin and the hemorrhage greatly lessened during operation. It can also be greatly controlled by inserting a pair of long compression forceps through the mucous membrane at the upper border of the trephine opening and clamping the septum firmly just above the plane at which it is to be divided transversely.

With a sharp bistoury, cut the septum transversely as near its anterior extremity as possible. Place a narrow, long handled, guarded chisel astride the septum and push it along the roof of the nostril, cutting the septum from the nasal bones back to the level of the first trephine opening, or until the chisel comes in contact with the compression forceps. Withdraw the chisel and insert it

in the same manner along the floor of the nostril cutting the septum free from the vomer back to the posterior border of the palatine bone. With scissors or chisel inserted at the height of the trephine opening divide the septum transversely and remove it through the end of the nostril; either entire or further divided as may be necessary. Tightly pack the nasal cavity and release the animal.

Our best results with this operation were obtained upon a grey gelding weighing about 1700 pounds. He was brought in with a history of having received a blow upon the nose about one year previous which seemingly resulted in extensive thickening of the septum so that the animal was entirely useless for draft purposes without wearing a tube. The operation was performed as described above and the animal has been working now two years. He has from the first shown a little roughness in breathing when exercised but his usefulness is in no way impaired and there has been no tendency toward recurrence.

In the other cases the thickening of the septum was much less marked. We were able to follow these cases but a short time after operation but so far as they were followed there was no recurrence.

There are two steps in the operation which I consider to be very important. The first is liberal opening of the nasal cavity, so that the operator may work rapidly and accurately through the trephine opening, and the second is postponement of the greatest hemorrhage by reserving the transection of the septum for the last step. Great care must be taken to avoid injury to the superior turbinated bones. The use of a tampon canula instead of an ordinary tracheal tube greatly assists in preventing inhalation of blood during the operation.

I have made a search for literature upon this subject but have been unable to find any though I make no claim to having made an exhaustive study. I wish to acknowledge the use of specimens from the anatomy department and the value of the suggestions of Dr. H. S. Murphey regarding the operation.

ILLUSTRATIONS

1—View of head showing point A at which the fingers begin to separate from each other when passed upward over the nasal bones. (Specimen by Dr. H. S. Murphey and photo by F. E. Colburn).



FIG. 1.

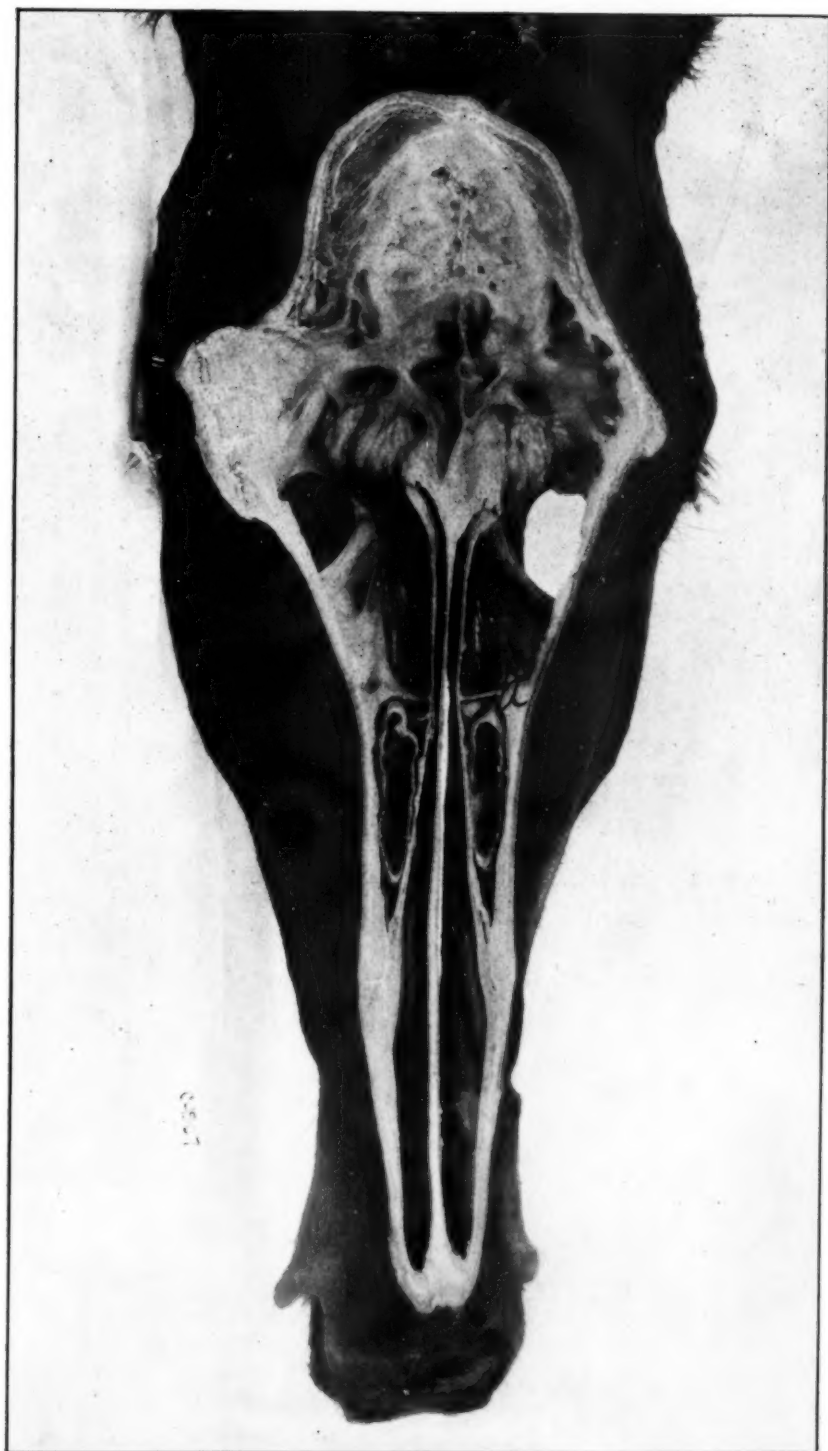
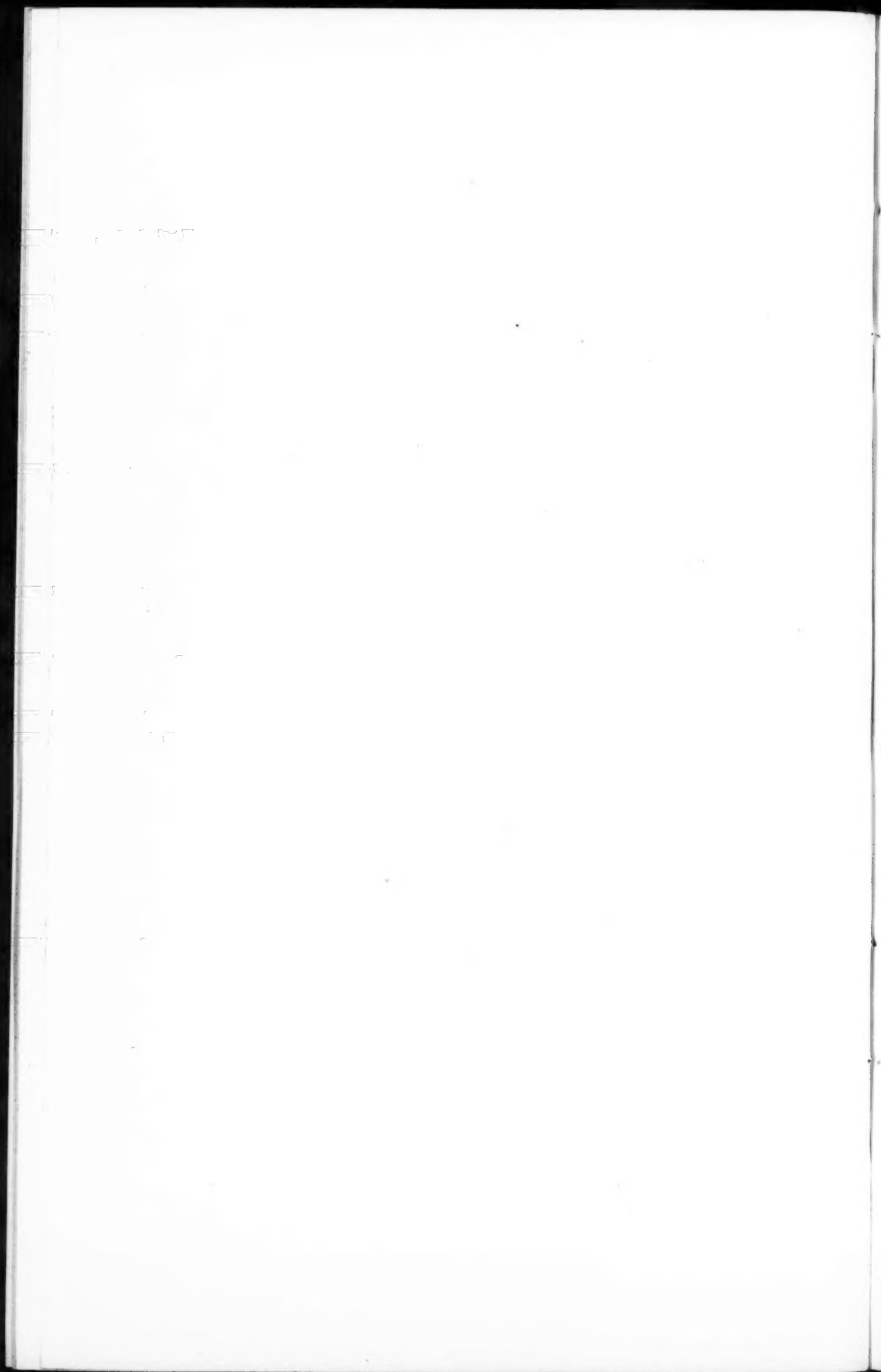


FIG. 2.



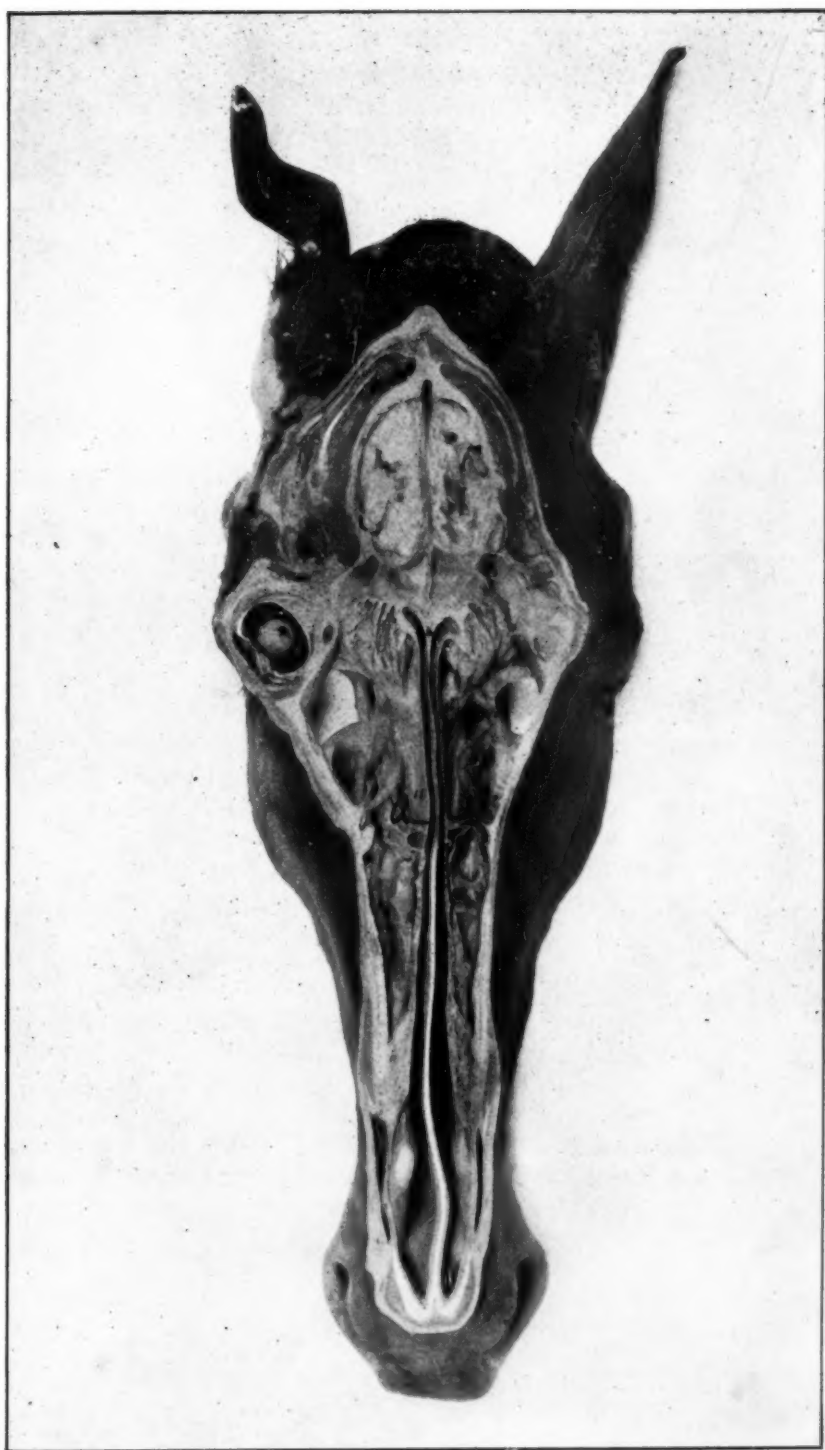
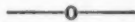


FIG. 3.

1871

2—Frontal section removed showing point A to be at same height as point A¹ in Fig. No. 1, the height at which the septum should be divided transversely. (Specimen by Dr. H. S. Murphey. Photo by F. E. Colburn).

3—Frontal section of head of a horse showing a thickened and deflected septum. A¹ the height at which the trephine opening should be made. Note the small amount of space between the septum and turbinal bones at this point. (Specimen by Dr. H. S. Murphey. Photo by Colburn).



EVERSION OF THE RECTUM AND VAGINA IN A SOW

C. A. FAST, Haviland, Ohio.

The patient was a grade Chester White sow weighing 175-200 pounds with second litter of pigs. She was delivered of five healthy pigs but continued to labor and strain. The next morning I was called again to see her and found the mucosa of vagina and rectum everted, forming a mass as large as a human fist. The prolapsed mucosa was replaced, gauze packs inserted and a strong bandage applied across the perineum. The owner was instructed not to feed for a few days. Water was allowed. Three days later the owner reported the sow fully recovered and I advised him to turn her out with the rest of the hogs.

About ten days later estrum came on and with it a return of the eversion of the vagina and rectum. I decided to operate. The operation was as follows: After thoroughly irrigating the rectum and vagina I placed a home-made hollow wooden tube in the rectum, ligated and allowed the prolapsed markedly congested mucosa to protrude. The vaginal mucosa was disinfected, returned and the lips of the vulva stitched with deep suture, which included the fascia and skin of the perineum for an inch or inch and a half on each side.

In three days the protruded ligated mucosa of the rectum sloughed off and the wooden tube was passed. Later the stitches in the vulva were removed. The patient made a rapid recovery. At no time was there any increased temperature.

The five pigs died in 24 hours due to lack of nourishment.

The wooden tube was made out of an oak pitchfork handle.

It was about $1\frac{1}{2}$ " x $2\frac{1}{2}$ " with an opening through its center $1\frac{1}{4}$ " diameter for the passage of the feces.—*The Veterinary Alumni Quarterly, O. S. U.*

A CALF WITHOUT FRONT LEGS

E. P. JOHNSON, Raton, New Mex.

The accompanying photograph is of a calf born without front legs. At the time this picture was taken it was ten days old. It



will be noticed the anterior portion is off the ground; the calf is trying to walk, (backwards). The spine of the scapula is on a line with the long axis of its body; otherwise the calf is normal.

AN UNUSUAL OBSTETRICAL CASE

R. A. GREENWOOD, Painesville, Ohio.

This calf was delivered from a six year old grade Guernsey cow April 9th, having carried it 282 days, the photograph of which is just as it was delivered.

Upon my arrival at the farm which was about nine miles from my office, the entire bowels were presented, an examination revealed the bony parts of the pelvis and legs. The heart, as will

be seen in the plate, was outside the thoracic wall, although not beating, indications were that it was, prior to its being forced through the pelvic arch.



This distorted individual has the appearance of the posterior limbs being pulled back and over the body, and the spinal column left intact.

In the photograph the calf is lying on its left side.

INTUSSUSCEPTION IN THE HORSE

P. G. B.

A cart gelding, aged six, belonging to a market gardener. Horse of the heavy vanner type. Had done well since purchase; was a good worker, quiet and temperate in all harness. Had no illness prior to its last, and was in a very fair condition.

It was sent to town twice a week after a load of stable manure, it was the shaft horse, had a careful driver, and a man accustomed to horses.

On its return with its last load it showed slight abdominal pain on being let out of harness, thought to have colic; a draught was given. It got easier and was left for the night. Next morning it failed in its appetite, although it had eaten up its night feed. I then saw it for the first time; gave a dose of aperient medicine and left some fever mixture.

The condition of the animal's temperature 102, rather cold at the extremities, ears and legs; breathing rather short, no cough, no sweating, and not very restless; occasionally lay down. These symptoms continued for a few days. It walked very slowly when led out, and was stiff in the hind quarters; the flank drawn up with a wasting of the loins. It ceased feeding altogether, but would drink heartily.

After a day or two a fetid odor from the mouth, and a peculiar gurgling sound heard at the base of the neck in front, not like the sound of pericarditis. There was no "tinkling" sound.

My diagnosis: abscess in the abdominal cavity due to external injury. Prognosis unfavorable. Patient gradually wasted. It passed at times some loose feces. No violent purging. Micturition normal.

Marked feature of the case: the wasting, and the very slow movement in walking with a rambling gait.

Illness lasted about ten days. Owner sending in word now and then that he thought the horse was better.

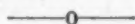
The fetid odor from the mouth continued nearly the whole time, and towards the end was very offensive. Seeing recovery hopeless, had the animal destroyed. Post-mortem examination showed intussusception of the cecum within the large colon.

The whole of the cecum was drawn in, and between the walls

of the two bowels about a gallon of pus. The cecum was turned inside out, as it were, within the colon.

The injury was due, in my opinion, to a kick or blow on the abdominal walls received on the near side.

I have never previously seen anything like it. I have not seen a case recorded. How is a veterinary surgeon to diagnose a case of this kind? Recovery was impossible. Case may interest some of your readers.—*Veterinary News*.



PURPURA HEMORRHAGICA TREATED WITH NORMAL HORSE SERUM

LAWRENCE SCHLENKER, M.D., St. Louis, Mo.

This case of purpura hemorrhagica, in a man aged 28, is instructive in the showing of a prompt response to treatment with normal horse serum.

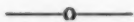
History.—The patient had measles during childhood. In his eighteenth year he suffered from an illness diagnosed as nephritis, from which he recovered in three weeks. While never robust, he had had no other diseases, and assurance is positive that he was never subject to abnormal bleeding of any kind. There was no knowledge of hemorrhage in any member of his family. The present illness began the middle of December, 1915, with symptoms diagnosed as grip. The temperature was from 103 to 104, and there were prostration, cough, and a mucopurulent expectoration. Under his physician's care he improved to some extent, when, January 9, he began to bring up large quantities of thin, bloody sputum. Two days later blood appeared in the urine, the latter soon taking on the appearance of pure blood. The following day purpuric spots occurred in the skin, and nasal hemorrhages took place frequently. It is stated that there was no vomiting of blood, no blood in the stools, and no aural hemorrhages. Exsanguination was now taking place so rapidly that the patient's condition was becoming alarming. * * * * *

Treatment and Results.—The patient was at once given 10 c.c. of normal horse serum, subcutaneously, which dose was repeated daily for the subsequent nine days, making 100 c.c. all told. With the exception of small doses of codein, given the first few days to quiet the nervous symptoms, no other medicine was administered.

There was no evidence of serum anaphylaxis at any time. Improvement in sputum, urine and in general condition was noticeable after the second injection of serum. Blood disappeared entirely from the urine after five injections had been given. The sputum became rapidly less in volume, as well as in the blood content. The moist rales in the lungs gradually became less evident.

January 29 there was neither cough nor sputum. The urine was normal in appearance, and negative to tests for albumin and sugar. Temperature was normal throughout the twenty-four hours. The pulse was stronger but still somewhat weak. Examination of the lungs showed entire absence of moist rales.

Strength, weight and color had improved greatly; the patient was up and about the institution. Except for some remaining weakness, which was steadily disappearing, he felt perfectly well.—*The Journal of the American Medical Association.*



TUBERCULAR MYOCARDITIS IN THE DOG

A. A. LEIBOLD, D.V.M.

Professor of Physiology; Assistant Professor of Pathology and Bacteriology
at The Chicago Veterinary College.

Tuberculosis is a common disease among some of our domestic animals, particularly cattle and swine. Fowls also suffer from this scourge to a far greater extent than is commonly believed. Dogs, cats, horses, mules and asses are not attacked by the *Bacterium tuberculosis* with the same frequency with which we find the first named animals attacked.

The *Bacterium tuberculosis* attacks lymph tissue and the parenchyma of some of the vital organs more frequently than other tissues of the body. The skeletal muscles of the body are rarely, if ever, tubercular but some cases of primary tuberculosis of the myocardium in man have been reported (2, 3, 4, 5). Herzog has had such a case brought before him (verbal communication). The fact that the myocardium is seen affected in this way in rare instances but the skeletal muscles seldom, if ever, may be the result of the peculiar high type of specialization of muscle tissue we find in the cardiac muscle.

Tubercular pericarditis is of more frequent occurrence than any other form of tuberculosis of the heart or its serous coverings (3, 5, 7), but in many cases it seems to follow pulmonary tubercu-

losis or generalized miliary tuberculosis (1, 3, 6, 7). However, primary independent tuberculosis of the pericardium occurs quite frequently in man (5) but tubercular myocarditis and endocarditis do not occur with nearly this same frequency (5) but follow mostly generalized miliary tuberculosis (3, 7). Tuberculosis of the valves of the heart seldom occurs except where the tubercular infection was preceded by a pyogenic infection of the valves which prepared the site for the tubercle bacillus (7). But a case of endocardial tuberculosis in a man is reported (8) which is claimed to have originated from primary infection with the tubercle bacillus. A noteworthy thing regarding this case is that the tubercles were found on the papillary muscles in the left ventricle and that at systole these tubercles came in contact with one another. The conjecture is that one tubercle derived its origin from the other through actual contact of the healthy papillary muscle with the tubercular. This case was observed in a man who died of more or less generalized miliary tuberculosis.

The upper or outer layers of the myocardium are not often involved as a consequence of tubercular pericarditis but we find endocardial and especially subendocardial tubercles fairly often in generalized miliary tuberculosis and in such conditions one can see individual or groups of miliary tubercles lying deep in the myocardium (7).

The infrequency of tuberculosis in dogs and especially tuberculosis of the heart or any of its coverings, and the inability of the writer to find a case of this kind in the dog after perusing voluminous literature, prompts him to report the following case brought to his attention:

The subject was a wire-haired, male, fox-terrier, born and registered in England, having been imported to the United States the latter part of June, 1914. He was a comparatively young animal. About three months after importation this dog was brought to the office of Dr. C. A. White, the owner complaining that the dog suffered from pneumonia. Before the dog was brought to Dr. White's hospital for treatment the owner said the dog showed dyspnea upon exercise but not the painful symptoms which caused him to suspect pneumonia. The dog was sick three days and then died.

Pathological lesions found upon postmortem examination were wanting except in the case of the heart and lungs. In the heart extensive grayish-white nodule formation had occurred which was

apparent both under the endocardium and pericardium. Upon incising the myocardium it was found that in some places the new-formed tissue had penetrated entirely through the muscle. The nodules had become confluent in some instances. The right half of the heart was considerably more affected than the left half and the walls of the auricles were more affected than the ventricles and in some instances were four times the normal thickness. The lungs were quite severely congested but did not show any other lesions.

Microscopic examination of the heart lesions showed inflammatory infiltration areas which were more or less definitely outlined but in some places the round cell infiltration extended between the fibres of the myocardium. Staining of such sections by the Ziehl-Neelsen method revealed a number of tubercle bacilli within the areas of round cell infiltration. Microscopic examination of sections of the lungs did not reveal anything more than a severe passive congestion. These microscopic diagnoses were confirmed by Dr. Maximilian Herzog.

BIBLIOGRAPHY

1. H. BAMBERGER. *Lehrbuch der Krankheiten des Herzens*. Page 111.
2. THOS. E. SATTERTHWAITE. *Diseases of the Heart and Aorta*. Page 104.
3. A. L. BLACKWOOD. *Diseases of the Heart*. Pages 113 and 114.
4. *Die heutige Lehre von den pathologisch-anatomischen Grundlagen der Herzschwäche*. Year 1906. Page 59.
5. A. D. HIRSCHFELDER. *Diseases of the Heart and Aorta*. Page 244.
6. WM. STOKES. *The Diseases of the Heart and the Aorta*. Page 78.
7. ED. KAUFMAN. *Lehrbuch der speziellen pathologischen Anatomie*. Pages 22 and 49.
8. Virchow's *Archiv für Pathologische Anatomie und Physiologie und für Klinische Medizin*. Vol. 210, page 248.

LITTLE DAMAGE TO THE ABBOTT LABORATORIES. A small fire with explosion of gases occurred April 21st on the top floor of one of the buildings of The Abbott Laboratories. Newspaper reports of the extent and character of this accident were grossly exaggerated. The damage was very small, consisting mainly of broken window panes and cracking of temporary partitions. The plant and machinery were injured but slightly, and the entire force went to work the next morning as usual. The Abbott Laboratories have issued a statement positively denying the newspaper reports that this firm is or has been engaged in the manufacture of ammunition or explosives.

ABSTRACTS FROM RECENT LITERATURE

NICOTINE POISONING. Arnold Spicer, F.R.C.V.S. *Veterinary Record*.—An army mare suffering with lice was clipped and dressed, as far as can be known, with a 1 to 20 solution of nicotine, instead of 1 to 120. An hour after the dressing was applied, she began to blow hard and show pain and broke out into a very profuse perspiration. Seen two hours after, she was still blowing hard and lying down. She was made to get up and walked staggering and trembling all over. She was taken to her box showing twitching of the neck muscles and jerking her head up and down. The extremities were cold, the pulse imperceptible and the temperature 93°F. There also appeared to be a form of lock-jaw, as the jaws could not be opened to permit the administration of a ball. Drenching was also very difficult. The mare gradually improved and was entirely recovered the next morning. A. LIAUTARD.

PECULIAR BREED OF GOATS. J. J. Hooper. *Science*, Vol. 43, p. 571, 1916.—There is a peculiar breed of goats raised in central and eastern Tennessee. When suddenly frightened the hind legs become stiff and the animal jumps along until it recovers and trots off normally or if greatly frightened the front legs become stiff also, and the goat falls to the ground in a rigid condition. They have received the name of "stiff legged" or "sensitive" goats.

The farmers in Tennessee prefer them because they do not jump fences. They are snow white and look like ordinary goats. We are starting experiments (Kentucky State University) to determine whether this is a dominant or recessive character in comparison with a normal goat.

When this peculiar affliction first appeared I cannot say, but it seems to be possessed by all the goats in the section named.

BERG.

THE MODE OF INFECTION IN PULMONARY DISTOMIASIS. CERTAIN FRESH-WATER CRABS AS INTERMEDIATE HOSTS OF *Paragonimus westermanii*. Koan Nakagawa. *Jour. Infect. Dis.*, v. 18 (2), Feb., pp. 131-142, pls. 2-5.—Nakagawa, working in Formosa where pulmonary infestation with flukes was first discovered by Ringer in 1879, has found encysted fluke larvae in crabs and demonstrated by experimental feedings to dogs that these are the larvae of the

flukes in question. The larvae were found to be fairly common in crabs of the species *Potomon obtusipes* and *P. dehaanii* and were found to be rare, perhaps only accidental, in *Eriocheir japonicus*. The young encysted larvae were found in the liver of the crab; full-grown larvae were found on the gills. Larvae were sometimes found in the muscles. The larvae on the gills are visible as white specks to the naked eye. When removed from the gills, twenty per cent would float on the surface of the water and it is likely that infestation results from drinking the water so infested.

Puppies, brought from localities where there was no lung-fluke infestation in man, were fed these larvae. In 60 days the lungs had lungfluke cysts, but the eggs were not yet present; in 90 days eggs were present. A series of feeding experiments showed the following facts: Five days after feeding the larvae to a dog the lungs showed no macroscopic changes; in 7 days, fresh petechiae, no larger than a pinhead, were seen; in 14 or 15 days the surface of the lung showed hemorrhage, especially on lower lobes; from the twenty-first to the twenty-seventh day, small nodules appeared, besides hemorrhagic spots, the two usually associated; in 35 days hemorrhagic spots as large as flaxseeds; in 50 days the cysts of the fluke, as big as the end of the little finger, were present.

Postmortem examination of pups from 12 days to 4 weeks after feeding showed comparatively large amounts of serous exudate in the abdominal cavity; liver usually congested; diaphragm with numerous small perforations; many distomes attached to the surface of the liver and the great omentum; few petechiae, the size of a pinhead, on the spleen and the mucosa of the jejunum; hemorrhagic spots on the pleura; many hemorrhagic spots and small nodules in the lung. A microscopical section through a petechia in the jejunum showed that the young flukes penetrated the mucosa and muscularis and escaped through the serosa to the abdominal cavity. Similarly it was shown that they penetrated the diaphragm.

It appears from the foregoing that the young fluke, when ingested, penetrates the intestinal wall near the jejunum and attains the abdominal cavity; it then penetrates the diaphragm and attains the thoracic cavity; from here it makes its way into the lung. Some flukes make their way into the organs other than the lungs but do not attain mature development in such situations.

Nakagawa has also ascertained that the miracidia hatched from the eggs of the lung fluke will infest certain molluses, *Melania*

libertina and *M. obliquegranosa*, and surmises that these forms may figure as intermediate hosts, but he has not demonstrated this point experimentally.

(It may be noted in passing that Ward and Hirsch (1915) have shown in a comparative study that the species of fluke described from the lungs of a tiger and known for a long time as *Paragonimus westermanii* is not identical with the lung fluke found in man by Ringer and described by Cobbold as *Paragonimus ringeri*, the latter name being, therefore, the correct one for the human lung fluke. The lung flukes reported from the United States from the hog, dog and cat constitute a third species, *P. kellicotti*, which is a form of some interest in meat inspection.)

M. C. HALL.

PARALYSIS OF THE RECTUM AND BLADDER. Lieut. J. Fox, A.V.C. *Veterinary Record*.—Common light draught mare, aged 13, with no obtained history. She was said to be suffering from debility and paralysis of the rectum.

Her symptoms were: sphincter ani relaxed, quantity of feces protruding from the anus. There was incontinence of urine and the thighs were irritated by the imperfect and continuous dripping of the urine, which sometimes was expelled in drops or again in a stream. There was a partial paralysis of the tail, especially the levator muscles. Atrophy of the gluteals. No feces were passed. Vagina was normal. The rectum was dilated and 26 lbs. of fecal matter drawn away. Nothing abnormal in the pelvic cavity except great fullness of the bladder. Outwardly there seemed to be an appearance of enlarged sacral region which was probably due to the atrophy of the muscles. Physic ball and daily injections of strychnine proved useless. The animal was removed and lost sight of.

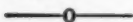
A. LIAUTARD.

FLEXOR PEDIS PERFORATUS TENDON SLIPPING OFF THE OS CALCIS. R. Hudson, F.R.C.V.S. *Veterinary Record*.—This and the following were related at one of the meetings of the North Midland Veterinary Medical Association.

A posting mare when putting weight on one of her hind legs, was unable to hold the hock rigid and the quarter sank down. She became so bad that she was useless. The tendon of the perforatus was slipping outward until it was held by the tendon of the gastrocnemius. The owner decided to have the mare destroyed. Before

doing it, the operation of the division of the tendon between the hock and the fetlock followed by deep point firing on the side of the os calcis, where the tendon slipped over, was suggested and carried out. The mare was allowed seven or eight weeks' rest. When she was put to work, no slipping of the tendon could be seen, although the quarter still sank some. The mare pulled a bus for two or three years after and then was lost sight of.

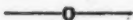
A. LIAUTARD.



FRACTURE OF THE JAW IN DOG. R. Hudson, F.R.C.V.S. *Veterinary Record*.—1st case. A racing whippet was run over by a motor car. Result, both jaws were fractured. Under the influence of morphia, the upper incisors were brought into position and bound with silver wire to the canines. The incisors of the lower jaw were secured in the same manner and then the two jaws were bound with broad tape and secured around the neck. This was left in place for 14 days. The dog was fed milk and soup, given with a spoon. Solid food was not allowed for two months.

2nd case. Large red retriever, of rather ugly disposition, had been run into by a tram. Result, a fracture of one side of the lower jaw. It was a clean fracture, about on a level with the premolars. Chloroform was administered. The divided ends of the bones were brought into position. "Two wire sutures were passed around the jaw, enveloping the ends of the fracture. The needle entered at the lower border of the jaw, passed alongside of the bone, was brought into the mouth, between the teeth, ending again on the opposite side, keeping close to the bone and out at the edge of the jaw where it first entered. The suture was then twisted up. A second suture was carried around the bone, enclosing the divided ends in a similar way, about half an inch below." The sutures being satisfactorily fixed, the jaws were bound with a tape. After a difficult after-treatment due to the ugly disposition of the dog, in relation to the keeping on of the bandage, of the muzzle, and of the mode of feeding, all of which took about four weeks, the dog made a good recovery.

A. LIAUTARD.



CHEMICAL REACTION OF VAGINAL AND UTERINE SECRETIONS OF THE MARE AND ITS INFLUENCE IN COITUS. K. Hutschenreiter. *Wiener Tierärztliche Monatsschrift*, Vol. 11, pp. 449-483, 1915.—In the sexually sound mare, the vaginal mucous membrane is generally alkaline; the uterine mucous membrane is almost always strongly

alkaline, whether the mare is horsing or not. Excluding the exceptional cases, spermatozoa generally become motionless in the vagina of the sound, horsing mare inside of four hours after coitus, seldom after. Inside the uterus spermatozoa become motionless inside of ten hours, seldom after. Spermatozoa seem to retain their motility for a somewhat longer period in the vagina of the sexually sound mare that is not horsing. The destruction of the spermatozoa in the vagina and uterus of the sexually sound mare is caused by leucocytes and phagocytes. During phagocytosis in the vagina there is an increased secretion by the mucous membrane.

In the sexually sound, horsing mare, part of the sperm is ejaculated directly into the uterus during coitus: in the sound, sexually resting mare this does not take place because of the closed os uteri. Every vaginal irrigation may be regarded as a stimulus and favoring phagocytosis. Sodium bicarbonate tends to preserve the motility of the spermatozoa, physiological salt solution is indifferent. The value of irrigations lies in their creation of conditions favorable to ejaculation into the uterus, by the removal of the mucus from the vagina and the region of the os uteri. Irrigation also acts as a stimulus causing a partial opening of the os uteri. BERG.

PERSISTENT CONSTRICTION OF THE CERVIX UTERI IN THE COW APPROACHING PARTURITION. W. J. Paimans. *Archiv für wissenschaftliche und praktische Tierheilkunde*; Vol. 42, pp. 64-92, 1915. In cows and especially in heifers, persistent constriction of the cervix uteri occurs sometimes, when labor pains are apparently present. At this time there are no active, convulsive contractions of the cervix. The cervix without having undergone any pathological-anatomical alterations is normally rigid in the cow. In premature labor pains and in spasmodic closure of the cervix or its delayed opening, there are no normal, complete labor pains, there are no contractions of the uterus, only straining of the abdominal muscles. If the cause be removed, the straining disappears and with it the accompanying phenomena. The straining is caused solely by a part of the gravid uterus having found its way into the pelvic inlet either through an invagination of the vagina alone or along with part of the uterus and contents. The cervix lying close to the vulva or the incomplete prolapse of the vagina are in part the primary cause of straining and not its result. Treatment consists in repelling the part of the uterus into the pelvic cavity.

Care should be taken to prevent straining and prolapse by pinching the back of the animal and maintaining the hind quarters in high position. Pathological rigidity of the cervix through cicatricial contraction, or fibrous, scirrhus, sarcomatous, carcinomatous changes, or by the formation of cartilaginous or calcareous deposits, is very rare in the cow. Aside from the usual Cesaerian section, favorable results can be obtained in pathological rigidity of the cervix only through vaginal hysterotomy, i. e., cutting into the cervix. Although numerous workers have performed this operation successfully, Paimans considers it very dangerous. BERG.

INTOXICATION WITH LIQUID TAR. Mr. Nieder. *Rec. de Med. Veter.*—A four year old mare had eaten tar used for mending roads. She refused all food, her nasal and buccal mucosa were covered with numerous superficial erosions. The urine was bloody. She exhibited all the symptoms of acute gastro-enteritis, complicated with nephritis and hemoglobinuria. Her conjunctival membranes were of a dirty yellowish color. The heart was weak, pulse hard and thready. There was great prostration. The urine was very dark, thick, without blood corpuscles, it contained 0.90% of albumin. Treatment—caffeine, camphor, sulfate of soda; gave no result and death took place after 48 hours of illness. Post-mortem revealed the classical lesions of hemorrhagic gastro-enteritis and acute hemorrhagic nephritis.

According to the writer, death was due to the oil of anthracite "carbolic" compound of the liquid tar which has a characteristic odor readily detected in the mare during her life. A. LIAUTARD.

INTOXICATION BY CALOMEL. Mr. Nieder. *Rec. de Med. Veter.* Ten year old draught horse was subject to intermittent, dull colics. He had received in three days 16 grams of calomel. Half of it one day, the balance three days after. On the 5th day he passed bloody urine, and was considered as suffering with acute hemorrhagic nephritis. Three days after, the general condition improved and to the hematuria succeeded a severe polyuria due to the diuretic action of the calomel. After fifteen days all the bad symptoms passed away and recovery was complete.

According to the writer, this case showed that 8 grams is the only dose of calomel that can be given as a maximum, and which ought not to be renewed without running a risk of an intoxication that might prove fatal. A. LIAUTARD.

HORSES INJURED BY BEE STINGS. A. Mayer. *Münchener Tierärztliche Wochenschrift*; Vol. 66, p. 856, 1915.—Two horses in harness were passing a bee hive when one of the horses fell. Both were soon covered with bees which had been rendered irritable by a long period of bad weather. The bees were especially numerous on the head and ears. The horses were soon in need of veterinary aid.

They were rubbed with dilute ammonia water, then washed with 2% lead acetate solution, and given morphine injection. Great difficulty in breathing during the next few days on account of the swollen wings of the nostrils. For several days they could not pick up feed on account of the inflamed swollen lips. The resulting weakness and threatened collapse were treated with alcohol while the external treatment with lead acetate washing was continued.

After a week the horses showed the following interesting picture: At numerous places on the body, there were nodules as large as beans or almonds. On pressure, a thick yellowish pus came out. These abscesses became confluent, and threatened an extensive necrosis of the skin; that of the ears seemed unavoidable. However, after a careful and persistent expression of the pus, treatment of the wounds with Burow's solution (aluminum acetate) and dusting the wounded surfaces with iodoformtannin, the horses were out of danger in three weeks.

BERG.

—o—
SULPHURET OF CARBON AGAINST GASTROPHILUS EQUI. Mr. Nieder. *Rec. de Med. Vet.*—Three horses were brought for consultation because of dullness and unwillingness to work. They were in a satisfactory general condition and all had around the edge of the anus, larvae of oestri. On one only, the examination of the blood showed a well marked characteristic eosinophily, which was considered as due to the presence of animal parasites.

The three horses received, first a purgation with a bolus of 20 grams of extract of aloes. The next day, on an empty stomach they received successively four capsules of 10 grams of sulfuret of carbon, given at one hour intervals. The success was complete. The following day, numerous dead larvae were thrown out and none of the horses manifested any of the symptoms of intoxication as mentioned by some as accompanying the administration of sulphuret of carbon.

A. LIAUTARD.

EVERSION OF THE RECTUM—EXCISION. R. Hudson, F.R.C.V.S. *Veter. Record.*—A yearling Shire colt was found in the field with bowel protruding. The condition existed for some days, as the organ was tumefied and lacerated. The prolapsus measured eight inches. After antiseptic care, it was smeared with lard and with little difficulty returned in place. Although the anus was packed with cloths, and the tail tied tightly, the trouble returned and the next day an operation was decided upon and performed. "After casting, anesthetizing, emptying rectum, washing with carbolic solution, a tape suture was passed through the skin and bowel in the upward direction, then out from side to side to hold the bowel from slipping into the rectum after removal of the protruding portion. An incision was carried around, and as it came to the tape sutures, they were tied and the ends left on to pull at, while numerous interrupted sutures of strong silk were inserted through the mucous membrane, subcutaneous tissue and the skin of the anus." Soft bran mashes and gruel to drink was the diet prescribed. Attention to the rectum was necessary until the animal passed his feces by himself and without straining. It took several weeks before a normal condition existed.

A. LIAUTARD.

—o—

THREE YEAR OLD COLT HAD NAVICULAR DISEASE. Henry Taylor, F.R.C.V.S. *Veter. Record.*—The colt was the issue of a sound sire and dam. While being broken to harness, he became suddenly lame. The seat of lameness was located in the region of the coronet. He was blistered and became almost sound in about two months. After a while the lameness returned and the colt began to point. He was unnerved. Was able to work for one year until he became lame again. The ends of the divided nerve in growing together again were sensitive to the prick of a pin. A small neuroma had appeared, the feet became smaller and contracted, the colt was unnerved again and after some time became practically sound and useful.

A. LIAUTARD.

The next meeting of the Missouri Valley Veterinary Association will be held at Omaha, Neb., July 10, 11 and 12.

Dr. F. C. Hershberger, who has been at Blagovestscheusk-on-Amur in Siberia, has left for Pa-hei-ho, North Manchuria, China, to be stationed at the government hospital.

PROCEEDINGS OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION

(Continued from page 292)

PRESIDENT MARSHALL: If that is the understanding of the association I think you are prepared to vote. It is an amendment. All those in favor of accepting the report of the executive committee to amend the by-laws so as to conform with the requirements of the civil service examination, make it manifest by saying "aye"; opposed "no". The "ayes" have it. It is so ordered.

DR. MAYO: Also at the meeting this morning (the notes have not been written up) the executive committee recommends that the history and civil government of Canada and Great Britain be substituted in this amendment for all colleges in Canada, in the place of United States history and civil government, for all graduates of Canadian schools.

DR. KINSLEY: I move that the recommendation be accepted.

DR. HOSKINS: I second the motion.

PRESIDENT MARSHALL: The motion has been made and seconded that Canadian and English civil government and history be substituted for the graduates of Canadian colleges, in place of the requirements of United States History for our own colleges. All those in favor of the motion——

DR. MAYO: This an amendment to the constitution.

DR. STANGE: Mr. President, I rise to a point of order. Is it necessary to vote on it at this time? My understanding is that the association does not vote on it until a year from now.

DR. MAYO: The Doctor is wrong. This is a report of the executive committee. These are amendments proposed by the executive committee and we accept the recommendation and the matter will be laid over until next year, when they will be voted upon as amendments to the constitution.

PRESIDENT MARSHALL: The question is called for. Those in favor of the question make it manifest by saying "aye". Opposed "no". The "ayes" have it. It is so ordered.

If there is no objection we will give the secretary a little more time to get his further report in shape, and during that time, we can hear Dr. Campbell, if he is prepared to report, as chairman of the Committee on Necrology. If there are no objections Dr. Campbell will give his report.

DR. CAMPBELL: There has not been an opportunity to consult with the other members of the committee on necrology since I got here this morning, so that if they have additional material to add it will be, as has been the custom, furnished later for the information of the publication committee.

The report of the committee on necrology is as follows:

REPORT OF THE COMMITTEE ON NECROLOGY

D. M. CAMPBELL, Chairman.

It is the painful duty of your committee on necrology to report the loss, by death, of a greater number of members during the

period intervening since our last meeting than the association has ever before suffered in a like period of time. The Grim Reaper has garnered his victims from every line of veterinary endeavor, sparing not because of present usefulness, past accomplishment, or future promise, but has called to the Great Beyond those whose record of service to this association, to their immediate localities and to humanity in general, we shall ever cherish as a cheering memory and pass on as a heritage to those who follow us and to the whole profession of veterinary medicine; He has likewise with impartiality compelled us to mourn members taken from our midst at the very threshold of their greatest usefulness, leaving us to contemplate with bitterness the bright hopes and great promise blasted by their untimely deaths.

To the bereaved families and near friends of these deceased and to their larger communities, this association extends its sincere sympathy in their loss, which is its own as well.

John Buford Archer, D.V.M. Residence, Spencer, Indiana. Graduated from the Indiana Veterinary College 1901. Died June 12, 1914.

Francis Bridge. Residence, Philadelphia, Pa. Born in 1835. Died at his home March 26, 1914 of a complication of diseases.

H. T. Doak, D.V.S. Residence, Bisbee, Arizona. Graduated from the Kansas City Veterinary College 1905.

Wm. A. Dryden, V.S. Residence, Columbus, Indiana. Graduate of the Ontario Veterinary College 1892. Died at Oxbridge, Ontario, 1911.

T. B. Hillock, V.S. Residence, Columbus, Ohio. Graduate of the Ontario Veterinary College 1872. Died March 4, 1914.

Edward L. Kalb, V.S. Residence, Rochester, Minnesota. Graduate of the Ontario Veterinary College 1893. Died at his home August 2, 1914.

Paul C. Koto, M.D.C. Residence, Forest City, Iowa. Graduate of the Chicago Veterinary College 1895 and attached to the office of the state veterinarian for 18 years, 9 years an assistant, and 9 years as a state veterinarian. Died at his home January 19, 1915.

Milton F. Leffingwell, D.V.S. Residence, Austin, Minnesota. Graduate of the Chicago Veterinary College 1892. Died December 15, 1913.

James A. McCloskey, V.M.D. Residence, Philadelphia, Pa. Graduated from the University of Pennsylvania 1908. Mail returned marked "Dead" in 1914.

Walter McHenry, V.M.D. Residence, Marion Center, Pa. Graduated from the University of Pennsylvania 1908. Died at his home August 6, 1913.

David McKibbenger, V.M.D. Residence, Philadelphia, Pa. Graduated 1906 Ch. of Philadelphia, M. I. Federal service. Died of Bright's disease, August —, 1915.

W. H. McKinney, D.V.S. Residence, Kansas City. Graduated from the Chicago Veterinary College —. Died at his home February 23, 1914.

Edward Woodyear Mumma, V.M.D. Residence, Lexington, Ky. Graduated from the University of Pennsylvania 1912. Died at his home December 4, 1914.

John W. Nicholson, M.D.V. Residence, Chicago, Ill. Graduated from the McKillip Veterinary College 1909. Mail sent to his address June 4, 1914 was returned marked "Deceased."

Chas. B. Parker, M.D.C. Residence, Monticello, Minnesota. Graduated from the Chicago Veterinary College 1906. Mail returned marked "Deceased" 1914.

Don W. Patton, D.V.M. Residence, Steele, North Dakota. Graduated from the Iowa State College 1893. Died May 27, 1914.

Henry D. Paxson, V.M.D. Residence, Chicago. Graduated from the University of Pennsylvania 1893. For a number of years engaged in the federal meat inspection service and was a member of the faculty of the McKillip Veterinary College. Died ((about) June 28, 1915.

Wyatt E. Ralston, D.V.M. Residence, Pullman, Washington. Graduate of the Ohio State University 1904. Died December 18, 1913.

Francis T. Richardson, D.V.M. Residence, Fallon, Nevada. Graduate of the Washington State College 1907. Died of anthrax August, 1914.

Daniel Elmer Salmon, D.V.M. Residence, Butte, Montana. Graduate of the Veterinary Department at Cornell University. Organizer and for 25 years Chief of the United States Bureau of Animal Industry. President of this Association 1897-98. Died August 30, 1914. See report of Salmon Memorial Committee, October, 1915, p. 101, by Dr. W. Horace Hoskins.

Anthony Small, D.V.S. Residence, Hayward, Calif. Graduate of the San Francisco Veterinary College 1910. Mail returned 1915 marked "Deceased."

Henry S. Smith, V.S. Residence, Albion, Michigan. Graduate from the Ontario Veterinary College 1889. Mail returned in 1914 marked "Dead."

B. A. Sugden, V.S. Residence, Montreal, Canada. Graduated from the McGill University 1897. Died July 30, 1915.

George M. Walrod, V.S. Residence, Stormlake, Iowa. Graduated from the Ontario Veterinary College 1894. Died of apoplexy September, 1914.

DR. MAYO: Mr. President, in explanation of the blunder which appeared in regard to one of our members who was reported deceased when he was not, I will state that I used every available means possible to keep track of the members, but when mail comes back marked "Dead", I assume the man to whom it was sent is dead. That is the way it occurred. Naturally I took out the man's card and put on it the information I had, which was sent to the committee on necrology. That is how the mistake occurred.

DR. KINSLEY: I move that the report of the committee on necrology be accepted. Seconded by Dr. Hoskins.

PRESIDENT MARSHALL: It has been moved and seconded that the report of the committee on necrology be accepted. All those in favor of the motion signify it by saying "aye"; those opposed "no". Carried. It is so ordered.

DR. SHEPARD: As chairman pro tem of the committee on resolutions I would like all resolutions handed in before two o'clock this afternoon.

PRESIDENT MARSHALL: I believe that completes the program of the morning. There is a part of the executive committee report which has not been finished which we will take up this evening. It is unfortunate that that may have to be referred back for we will not have another session after that.

DR. STANGE: I wish to call your attention to the nominating committee which was to be appointed.

DR. MCKENNA: I move that the president be given until two o'clock to report the personnel of this nominating committee.

PRESIDENT MARSHALL: That will be a section; not a general meeting of the association.

DR. V. A. MOORE: The nominating committee would have to have time to report back to the association. Of course if the committee could report at a meeting to-morrow, or if there is a meeting of the general session at noon or this evening, you could appoint it privately.

PRESIDENT MARSHALL: I might make it a special order of business and appoint the committee as soon as we are through the symposium on shipping fever.

DR. STEWART: I move that we adjourn, to meet immediately following the close of the special section, the symposium on influenza, to transact unfinished business.

PRESIDENT MARSHALL: To finish all the business except the election.

DR. KINSLEY: I second that motion.

PRESIDENT MARSHALL: You have heard the motion and it has been seconded. Any remarks? Those of you in favor of adjourning to meet immediately following the symposium on influenza which is scheduled to take place in this room at two o'clock, signify by saying "aye"; opposed "no". The "ayes" have it. It is so ordered. We are adjourned.

Oakland, California, Sept. 2, 1915.

The sixth business session of the fifty-second stated meeting of the American Veterinary Medical Association was called to order by the President, Clarence J. Marshall, in accordance with the former adjournment, immediately after the symposium on shipping fever.

PRESIDENT MARSHALL: Gentlemen, the general session of the American Veterinary Medical Association is now open. The first order of business is a report from the executive committee. The secretary tells me he is not quite ready to report yet, but there are two or three other matters to come before the session. The first is the report of the committee on history.

Mr. Hicks of the Exposition Committee is here and would like to make an announcement before we proceed.

MR. HICKS: I would like to call your attention to the program for tomorrow morning. As you will see, to-morrow is American Veterinary Medical Association Day at the Panama-Pacific Exposition. The program for the morning is pretty well outlined, and all I want to say is that we will have to start early in the morning in order to carry it out on time. We will have to be on the cars in front of the hotel at 8:30 for they will leave at 8:34, so that we will be able to catch the nine o'clock boat going to the exposition, arriving there at 9:30. There we will be sure to meet you and show you onto the train. The party will take one of those miniature trains up to the Livestock Building, the Hall of Congresses. We have arranged to have a photographer there who will take your pictures. Then we will have our exercises,—the installation of officers. We will be there until a few minutes before eleven. The next trip will be to the Presidio where the cavalry will give us a special drill upon the parade ground, and it will take us a few minutes to go up there. They will begin the drill at eleven o'clock. It will be very interesting and we all ought to see it. The only thing I wish to add is that it will facilitate our work considerably if each member and each lady who accompanies the party will wear the little blue cross conspicuously.

PRESIDENT MARSHALL: Dr. Murphey will make the report for the Historical Committee.

DR. MURPHEY: Gentlemen, I wish to read some extracts from the paper of the chairman of this committee, Dr. D. Arthur Hughes of Chicago who is unable to be present but requested me to read in his place.

Dr. Murphey then read portions of Dr. Hughes's paper which is as follows:

REPORT OF THE COMMITTEE ON VETERINARY HISTORY

D. ARTHUR HUGHES, Chairman

H. S. MURPHEY
TAIT BUTLERW. L. WILLIAMS
F. H. OSGOOD

Mr. President and Gentlemen of the Association: At the fiftieth anniversary convention of this association, held in the city of New York, there was a strong feeling among the members, that, as the association was at that time celebrating the completion of a half a century of work, so something should be done to trace in writing the half century of progress made by the veterinary profession in America. President Mohler, in the oratorical close of his address, expressed the feeling which was tingling in the association when he eulogized the early leaders and paid tribute to their amazing industry, versatility and keenness of intellect; their unfaltering cultivation of the field of veterinary science; their devotion and the beneficial results of the time and abundant knowledge they gave to the service of the public and the profession. But he expressed the thought in everyone's mind in his memorable words: "From the history of veterinary medicine let veterinarians draw confidence in the invincible strength of their science; which, though at one time despised even by the well-informed, has during the last five decades attained such great importance and such wide influence in the life of this and other countries. And let them take fresh courage and make new resolutions to rival all the other professions in the useful work to be accomplished in the fifty years to come."

The consequence of the existence of the feeling that something should be done to put in writing the record of the profession for the five decades, mentioned by Dr. Mohler, was the passage of a motion calling for the appointment of a committee: "to provide for an outline of the history of veterinary progress in this country during the last fifty years". And that, "the complete report be kept in the archives of the society and that a summary of these reports be furnished at the next annual meeting by the committee and published in the next annual report".

The Work Attempted by the Committee. The writing of the history of a profession like ours, and covering fifty years of its progress, or treating it summarily or in outline, is a large task. Such a narrative, in which is related the many varied forms of progress that has been made in the half century, will, we must confess at

the outset of this report, take more than one year, probably several years. There never was a piece of historical writing, laden with knowledge, which took much time to accumulate, which did not consume years to write. Macaulay's History of England is a famous example, though it refers to a common experience, which covers only fifteen years of British history, and consists of five volumes; yet it took the gigantic intellect of Macaulay eight years to write the history. Time and much study are necessary if an excellent piece of historical writing is to be finished.

The committee, comprehending the desire of the association when it was appointed, and desiring to perform its work satisfactorily, devoted its attention to the preparatory steps for its work, attempting to make a survey of the field of American veterinary history for the last fifty years; to look up the historical materials or the sources of information which should be studied; to consider the difficulties to be overcome before the work could be gotten well under way. This preparatory study was the work of the chairman of the committee. Our colleague, Dr. Howard S. Murphey, gave his time to a study of certain phases of the local veterinary history of Ohio and Iowa.

Veterinary History—National and Local. There is a wide difference between national American veterinary history and local veterinary history. Local veterinary history concerns itself with what has been done, in any given period of time, in a particular section of the country—a state, province, county or city. Local veterinary history represents one part or section of national veterinary history. Consequently, the more local veterinary history is studied and written upon, the larger accumulation there is of local veterinary histories, the better can the national veterinary history be written. The duty of the history committee of this association is to write a history of veterinary progress for the last fifty years. The call here was for an historical narrative of the progress of the whole profession in its national signification.

The Problem of the writing of American Veterinary History for Fifty Years. The magnitude of the study of American veterinary history for the last fifty years is seen when one surveys the ground to be covered in such a piece of work, and comprehends the size of the task. The history of the five decades of progress called for should consist of many chapters or sections. There should be, first of all, a consideration of the whole question of the development

of veterinary education. A volume could be written on that alone—and a very large volume, too. Even an outline should cover the beginnings of veterinary education; the history of the veterinary colleges; the spread of veterinary knowledge; the attempts at standardization of veterinary education; the extension of veterinary educational methods abroad to the Philippines, and, through training of foreign students, to other countries. There should be a chapter or more on the history of the Bureau of Animal Industry from its origin in 1884 to the present. This also means the writing of a very large chapter, or more likely many chapters, in veterinary progress. One of these should be an account of the development of the work for the control of animal diseases through federal auspices, together with the facts of the cooperation of the states; and another should be on the development of meat inspection interstate and foreign. Veterinary legal development during fifty years would be another chapter, treating of food laws and veterinary history and the extension of federal food examination methods in the several states; federal and state drug laws, including such measures as the Harrison anti-narcotic law; the federal biologics law and the states. There should be a chapter on the development of veterinary practice laws, including a study of the work of examining boards. Our humane laws in their relation to the profession should not be neglected. The history of veterinary progress should also have much to say about the development of veterinary medical and surgical practice, comparing the beginnings of practical work with the scientific work done at present. Part of the history should concern itself with the struggle of the profession for recognition on a par with other professions and of the efforts for the recognition of the profession in the United States army. Nor should a study of the development of American veterinary literature be overlooked; of the development of pamphlet writing; of the improvements in textbook writing and general veterinary scientific publications. A chapter on the development of veterinary journalism would bring out many surprising facts; for, though we have not gone so far forward in this respect as the Europeans, we are making progress in this direction. Also a part of the study of American veterinary history should be given to the development of veterinary organizations, national and state, and of their influence in the making of veterinary progress. Considerable portions of any such history of veterinary progress would be given up to the makers

of American veterinary history; to movements for the good of the veterinary profession and how they were started; to concrete references to important changes brought about by individuals.

Such, broadly, are some of the phases of American veterinary history during the fifty years. A survey of the field shows its large area.

The Materials of American Veterinary History—or the Sources of Information. To write intelligently this part of American veterinary history, one must know the materials on which it is based, or be acquainted with the sources of information.

There are, in this case, three groups of materials—the national, state and individualistic.

Amongst the national materials, upon which one must draw for the narration, are, first, the United States Veterinary Association papers and The American Veterinary Medical Association annual reports. There are not a great many people who have a full collection of these. They are found mostly in private libraries at widely separated points. The great public libraries, like the Chicago and New York libraries, and the great medical libraries, like the Crerar library or Senn collection in Chicago, do not contain them in full sets. Another source of information, national in character, is the Bureau of Animal Industry annual reports, and, indeed, the whole collection of Bureau of Animal Industry publications. The chairman of your committee has a complete set of the Bureau of Animal Industry annual reports from 1885 until the government ceased their publication two years ago, and he has a large collection of Bureau of Animal Industry papers from 1903 onwards. But there is hardly anyone who has a complete collection and it is probably not to be found outside of Washington. Still another source of information would be the collected papers of the various secretaries of the United States Veterinary Medical Association and the American Veterinary Medical Association—not the sparse reports found in the annual reports; but the complete correspondence of all these secretaries which belong to our archives. These, if they are now to be procured, would throw floods of light on many questions of this progressing association during fifty years. Perhaps these files cannot now all be obtained, but as many as possible should be. The profession has met in annual convention in many cities and our object has been to stimulate interest in the profession at these points. Therefore newspaper accounts of places

where the association has met will give the local color and effect and editorials or other comment will indicate influences. Photographs and other notes are of historic value as an indication of tendencies. In writing of the literary progress of the profession a study must be made of publications in book form printed from year to year during the fifty years. In the beginning we had no books. Now we have many. What library is there that has a complete collection of veterinary books published in English in America during the half century? Such a collection would be of very great veterinary historic interest, indicating what progress has been made with the lapse of time. Similarly a complete collection of veterinary surgical instruments, used in America from year to year, or decade to decade during the period, has much historic value and would furnish the historian much information of national veterinary interest. The progress of veterinary surgery in America would be best learned from a study of them and the uses to which they were put. Of further national veterinary interest would be the study historically of a collection of drugs and appliances used from time to time during the fifty years. Development can be traced by studying the medical materials employed by empirics and their uses and comparing them with later medicines. The writer of national veterinary history, in order to know of the development of veterinary law, must consult a collection of such laws and regulations from the beginning of the fifty years. Step by step he must trace the development of veterinary law in enactments and the changes made in them. To write accurately he must avail himself of a complete collection of such laws. The development of veterinary journalism can only be safely traced from consulting a collection of sets of veterinary magazines and periodicals, both those now existing and those defunct. Fairness requires that humble or unpretentious publications as well as ambitious ones be studied. Even such privately printed periodicals, like drug house publications or college publications, must be considered; for all, whatever their immediate use to their owners may happen to be, have their effect on veterinary progress.

In the writing of fifty years of veterinary progress, state sources of information must be investigated. This point is illustrated in Dr. H. S. Murphey's report which follows: For instance the study of the laws and regulations in every state which have to do with control work, especially the progress made in each.

state in this line of work from time to time, the new laws and regulations which came into being, will help materially in writing the account of veterinary development in control work. Reference must also be made to the veterinary practice laws and regulations of each state, improved as they are on occasion by veterinary influence, if the writer is to treat this subject understandingly. The part veterinary examining boards have played in veterinary development can only be known by comparing them all and their influences and knowing the facts on the spread of veterinary intelligence through their work. Where is there a complete collection of all the practice laws with all emendations and the changes in regulations from the beginning of the fifty years? Yet a proper account of veterinary development in this line cannot be written until such a collection, or as much of such a collection as can be secured, is read and used in the work of writing. The veterinary colleges, particularly the state veterinary colleges, have published many papers of many sorts, referring to themselves and their work. Copies of all of these that are available should be secured as necessary material for chapters on the development of veterinary education in fifty years.

There are other sources of information on veterinary progress which must be had from individuals, or if the information wanted cannot be obtained at all, the narrative would suffer unless such information as is obtainable has been taken into account. Many veterinarians who have had much to do with veterinary progress have been great letter writers. In some instances men with epistolary gifts have done some of their most effective work through their letters. Collections of letters are often very valuable sources of information and they will prove so to the man who writes veterinary progress. Private journals and scrap books frequently shed light for the historian and we doubt not there are in existence such mines of information which belonged to veterinarians who helped in the making of veterinary progress. If so, these sources of information should be consulted. It is within the family circle that a man is best known. Some men are inveterate collectors. The family treasures of celebrated veterinarians will often contain notes and other manuscripts or collections of private papers of value as veterinary historical material. Families of veterinarians should not consign them to junk dealers or permit them to become mouse-eaten in garrets; but should turn them over to

veterinary libraries for preservation and use by the historian of veterinary progress. Published or unpublished speeches of veterinarians, with notes on the occasion of them and their effect, are of use historically, as are press notices, pictures and necrological notes and privately printed papers.

These—national, state and individualistic materials—are the sources of information for the writer on a half century of veterinary progress. The materials are vast in amount and not always easily accessible. Yet there would hardly be those who would have the temerity to deny that the many chapters of veterinary progress cannot be adequately written until such sources of information are drawn upon, and until each has rendered its quota of information on veterinary progress during the period to be studied. Investigation of them is the business of the historian: for historical research requires even more patience than scientific research.

Difficulties of the Committee Preparatory to Meeting Its Obligations under the Terms of Its Appointment and Suggestions for Improvements. The fact must be patent to everyone that the committee on veterinary history, asked, as it was, to write an account of veterinary progress during the first half century of professional life on this continent, would have difficulties. At present the necessary historical materials are incomplete, scattered, inaccessible to the historical worker. The sense of the importance of its historical materials has not been aroused in the profession. The profession knows that it is making progress; but very few persons know how great the progress is. The reason for this is that no short history of veterinary progress has ever been written. Nor can it be until the sources of information can be reached. The inaccessibility of data is due to the fact that no provision has been made for assembling it in accredited archives. We have had, up to this hour, no official depositories for national veterinary archives designated by us officially. What is needed is that we should decide upon a place for deposit of national veterinary archives and secure a place for their safe keeping and orderly arrangement. When such a place is decided upon, and officially sanctioned, those in office should be held responsible for the forwarding of documents and other materials of historical value to the official depository. In time, when it becomes known that we have a place for veterinary archives of national significance to us professionally, members of the profession will get the habit of sending books, pamphlets, manuscripts and substances to the officially designated depository.

It is of the highest importance that our national veterinary depository should be in Washington in a department of the Government in which the profession does much work. The library of the Surgeon-General of the Army at Washington is the greatest medical depository on the continent. If we are not mistaken its collections are in the Smithsonian Institution. The veterinary profession might find a similar depository; but it would be preferable to designate the library of the Bureau of Animal Industry as our official depository. An arrangement should be made with either the Smithsonian Institution or the Bureau of Animal Industry to take care of our archives. However fast they might accumulate they would in either place be well taken care of. When this was done cooperation could be brought about between the persons in charge of the veterinary depository, and the numerous producers of veterinary literature and substances, to enrich the archival deposit and make it useful to the veterinary profession.

In the same manner the profession should have an official depository in each state to which copies of veterinary publications of all sorts and manuscripts could be sent, arranged, systematized, and made accessible for the use of the profession. It is difficult to keep such records as things are now. Valuable records are easily lost, go out of print and may become unobtainable. The state association proceedings are apt not to be published and the records are therefore lost. State historical association papers and state historical documents of all kinds are usually published by the commonwealths at the state printer's office. Many veterinary publications in the states are state official documents and to ensure the keeping of a complete file of state veterinary documents it would be a short step to officially designate some state veterinary official as state veterinary archivist. The work of receiving, arranging and classifying could be done through either the state veterinarian's office or the office of the veterinarian of the state experiment station. The state veterinarian's office is usually in the capitol and the state librarian is near at hand. The state veterinary organization should be able to make this the agency for preservation of state veterinary archives, both those which are official state documents as well as those produced by its own organization and by veterinary schools or other sources of veterinary information.

Historical Museum of Veterinary Medicines and Surgical Instruments. While the chairman of the committee on veterinary

history was visiting the Smithsonian Institution, Washington, D. C., which is the national museum of the United States, and was seeing the magnificent scientific collections some time ago, he spent half a day examining the cases containing specimens of medicines, surgical instruments and appliances which have been used in the practice of human medicine in various epochs of this country's medical history. They are arranged for historic purposes, showing the development from barbaric methods and fake methods to modern medicine and surgery. They display the stupidity of quackery; the resorts to charms and myths of medicine at times for restorative purposes instead of scientific knowledge; the ignorance of medical practice when anatomy was not studied and no man dared to open a cadaver. The collection is still to be seen in the Smithsonian Institution, and it suggests the thought that the veterinary profession in America could hardly do better than to furnish such a collection to the Smithsonian museum to prove to the public visually the developments in veterinary medical and surgical practice. The public would learn much and the historian of veterinary progress would learn more. If these specimens are pictured, with annotations, in the history of the last fifty years, how illuminating the chapter would be.

The Feasibility of Writing a Short History of Veterinary Developments During the Last Fifty Years. An outline of veterinary developments for the period mentioned can be written and will be written when preparations are completed for accurate work. Slapdash work on such a subject won't do at all. Here fiction, legends and inaccuracies are unpardonable sins. The outline should cover the period suggested already in the report; but fully enough so as to do justice to the many forms of veterinary development; slighting none and overdoing none. The outline should be partly chronological and partly not. A great deal of the development has taken place during the last fifteen years and much of this does not call for chronological arrangement except to give dates when developments occurred. The sections may be made larger or smaller according to the weightiness of the data. It would be possible within the space of one hundred pages octavo to write in book form—chaptered and indexed—an acceptable short history of veterinary development. Such a work, it seems to us, should appear separately as a supplement to the annual report of the association of the year, a copy being furnished to each member when it is ready. This is

something that is not uncommonly done by learned bodies. It might be possible to get the Carnegie Foundation for the Advancement and Endowment of Education to print it or the Smithsonian Institution. The latter, for years, published free of cost the annual reports of the American Historical Association. We cannot tell the length of time it would take to prepare the book: for that depends upon ability to gather data and to write accurately.

Profit of the Writing of a Narrative of American Veterinary Development to the Profession. All the arguments which apply to the teaching of the history of the United States in our schools and colleges apply to the reading of American veterinary history by American veterinarians. It is good to teach American history in the schools because young Americans learn the grand accomplishments of the American people in the past and emulate those who have gone before them. The reading of American veterinary history by the student or those in practical professional life will raise their spirits through the power of noble example. The profession of the present and the profession of the future would profit by reading such a narration. Men who do not read history know nothing of their progenitors. Men who, veterinarians though they may be, know nothing of veterinary history have not that constant manly pride in their profession begotten of an ever-present knowledge of its past accomplishments.

Recommendations of the Chairman of the Committee on Veterinary History. In view of all that has been said the chairman of your committee recommends:

1. That the committee be continued for further study of the history of veterinary advancement, to report its progress as the work proceeds and at length when it is completed.

2. That steps be taken to turn to practical account the suggestions made in the report regarding a national depository for veterinary archives and the formation of a veterinary section in the medical museum in the Smithsonian Institution in Washington.

3. That the office of historiographer and veterinary archivist be established by the association, whose duties shall be: to take care of the association's archives and see that the national veterinary depository, previously mentioned, is furnished from year to year with documents or manuscripts valuable as material for the study of national veterinary progress; to write reports of national veterinary progress; and for other purposes of a similar nature.

4. That Dr. H. S. Murphey's report be accepted and turned over to the officer in charge of publications, with the recommendation that the *type-written matter therein be printed* with the customary lists of authorities from which the knowledge was drawn; that the documents attached to his report be kept in the archives of the association; but that Dr. Murphey be given permission to republish his report locally in Ohio and Iowa.

All of which is respectfully submitted.

D. ARTHUR HUGHES, Chairman.

DR. MURPHEY: I wish to say, that we went to no little trouble to collect the local data and this material, and so far as the usefulness of the committee is concerned, we feel that it is at an end, but on account of the recommendations made by the chairman of the committee, it seems to me there was some question as to whether we should confine the work of the committee to the chronicle of our history, or proceed with the establishment of a museum, which seems to be the chairman's idea. I move that the report be submitted to the executive committee to make what disposition of it as shall seem best. Seconded by Dr. Kinsley.

PRESIDENT MARSHALL: The motion has been made and seconded that the report just made by Dr. Murphey be referred to the executive committee for such action as to them may seem fit. Any remarks? All those in favor of the motion make it manifest by saying "aye." Opposed "no." The ayes have it. It is so ordered.

At the last session you instructed the president to appoint a committee of three to select a committee of five to act as the Salmon Memorial Committee. I appointed on that committee Drs. Hughes, Moore and Dunphy. If they are ready to report, I will call for that report at this time.

DR. HUGHES: I would state that we found it impracticable to limit this committee to five. Your committee appointed to select from the membership of the A. V. M. A. a number of names of members who might act as a standing or permanent committee for the purpose of arranging for the collection and administration of a fund to be known as the "Salmon Memorial Fund," beg to report that in their opinion this committee should comprise at least seven members which should be selected from diverse geographical locations, all of whom intimately knew and had high regard for the late and much lamented Dr. Salmon. The names of the following seven gentlemen are herewith respectfully presented by your temporary committee for your consideration: Dr. A. D. Melvin, Washington; Dr. J. A. Rutherford, Canada; Dr. J. F. Winchester, Massachusetts; Dr. W. H. Hoskins, Pennsylvania; Dr. S. Brenton, Michigan; Dr. J. A. Anderson, Nebraska; and Dr. D. F. Fox, California. I might mention that we found it utterly impractical to cover the ground with a smaller number than seven and we think it will redound to the value of the committee if the number is kept at seven. We did not make any attempt at all to indicate what should be expected from this committee, preferring to let the association work that out. Dr. Moore, I believe has some remarks to make with regard to what New York has already done in this respect.

PRESIDENT MARSHALL: Gentlemen, you have heard the report of the committee appointed to make suggestions as to the personnel of the committee. They have selected seven instead of five as ordered by you this morning. What do you wish to do with the report of the committee?

DR. MURPHEY: I move that the report of the committee be accepted.

DR. KINSLEY: I believe I made the motion that five should be appointed. Can I spread that to cover seven?

PRESIDENT MARSHALL: If the seconder of that motion will agree.

DR. KINSLEY: Is it understood one of those men will be appointed anew each year, or is the entire committee to be elected for seven years?

DR. HUGHES: We have made no suggestions in that respect. We would prefer to have the association decide.

DR. FAUST: I am willing to accept that change on the seven-year basis. I seconded Dr. Kinsley's motion this morning.

DR. DUNPHY: I was not in the room at the time I was named on this committee and I believe that all members of the committee were not certain that the motion confined us to five. We were not quite clear whether the committee was to select a committee or to select a definite number. We believed the territory would be covered in a better manner by seven than by five. The fact that the association has meetings on both sides of the continent, led us to think we would be more apt to have one or more representatives of that committee at each meeting by having a little larger committee and that it would cover the ground much better.

PRESIDENT MARSHALL: Any remarks?

DR. SCHNEIDER: I will suggest, if it is in order to make a motion to that effect, that the number be retained at seven and that two shall be re-elected every year, making an alternation of four years; two for the first year, two the second and two the third, and one the fourth year in rotation. when every member retires from the committee.

DR. MAYO: As I recall the motion this morning, it provided that the committee should consist of five; one to retire and one to be elected each year. If we have a committee of seven and one retire each year, it will not be necessary to mention the number of years, because it would take seven years instead of five.

PRESIDENT MARSHALL: Did the committee state whether the president was to appoint this number or were they to be elected by the association?

DR. HUGHES: I would state that we made some inquiries, at least I did, and got information which led me to believe that it would be better to merely select the names, and submit them, and let the association take subsequent action.

PRESIDENT MARSHALL: Then I think I understand the question this way: The committee has recommended seven men for the Salmon Memorial Committee, and we can select or reject those as we please, and if they are selected, then we can state later how they shall be appointed hereafter and the length of time each shall serve. Is that the way it is understood?

(To be continued)

SOCIETY MEETINGS

THE MASSACHUSETTS VETERINARY ASSOCIATION

The regular monthly meeting of the Massachusetts Veterinary Association was held at the Quincy House, Boston, on March 22. In the absence of President Plaskett, Vice-President Peirce presided. The records of the January and February meetings were read by the secretary, and approved as read. The secretary notified the association that the motion passed at the previous meeting contributing \$75. for the Salmon Memorial Fund, which was in addition to the \$25. previously voted, was not effective, inasmuch as the records showed that \$25. had not been previously voted. It was then moved and carried that the association appropriate the sum of \$100. to the Salmon Memorial Fund.

Dr. Brownell reported that he had attended the hearing of the Good Road Bill before the Legislature to represent the interests of this association. He reported considerable enthusiasm, and a favorable report from the committee. This bill is to compel the building of roads which are safe for horses to travel instead of the hard, slippery, asphalt roads which are now being built.

Dr. Cahill reported for the Directory Committee, and gave estimates from printing companies. The association then voted the sum of \$50. for the use of the Directory Committee in publishing a directory to include all registered veterinarians in Massachusetts.

The illness of Dr. Abele was reported to the association, and the secretary was instructed to send a letter and flowers, expressing the sympathy of the association.

The application of Dr. Samuel T. Howland was presented for membership. On motion, the secretary cast one ballot, electing Dr. Howland to membership.

Dr. L. L. Peirce spoke on the Milk Bill which is before the Legislature, which was followed by a spirited general discussion.

Dr. Cahill, for the Salmon Memorial Fund, suggested that the association finance an appeal to be sent to all registered veterinarians in the state toward procuring subscriptions for the Salmon Memorial Fund. The association voted to do so.

Dr. Hugh Dailey of the Angell Memorial Hospital then talked on Canine Distemper. Dr. Dailey spoke of his extensive experiments with this disease, and mentioned the fact that authorities

agree only on the post-mortem lesions. His personal opinion is that this is a protozoan disease, and that the flea is largely responsible for the transmission of the disease. He firmly opposed the promiscuous use of serum, either as a preventive or as a cure, and recommended most highly the use of quinine and calomel in large doses. He stated that in his opinion the only value in the use of serum was in promoting phagocytosis, but said that oil injected subcutaneously would do this just as effectively or even more so, and that it would not cause paralysis, which sometimes follows the use of serum. Dr. Dailey said that his best results were derived from 1/10 grain of calomel and from 2 to 15 grains of quinine in capsule four times daily from four to five days. If carried on longer than this, it may cause severe meningitis. He also urged the use of normal saline solution combined with olive oil, when extreme exhaustion is present, and discouraged the use of strychnine. In place of strychnine, he advocated the use of caffeine, camphorated oil, or ether. He did not favor forced feeding, and stated that the most favorable cases to treat are the ones which have a bad discharge from the eyes and nose. Considerable discussion followed Dr. Dailey's paper, after which he was given a rising vote of thanks.

The secretary read a letter from the A. V. M. A., regarding the Longley Committee for the selection of an emblem. This matter was laid on the table until the next meeting.

EDWARD A. CAHILL, Secretary.

THE MASSACHUSETTS VETERINARY ASSOCIATION

The annual meeting and banquet of the Massachusetts Veterinary Association was held at the Quincey House, Boston, on April 26. The meeting was called to order by President Plaskett. Records of the previous meeting were read and approved. The president appointed a nominating committee, composed of Drs. Frank Sturges, Elmer Babson, and Benjamin Pierce.

The secretary-treasurer read his annual report which summarized is as follows:

New members for the year.....	13
Deceased	3
Exempt from further payment of dues because of 25 years in good standing	11
Expelled from membership.....	11

Money in the treasury April, 1915....	\$290.02
Monies received for dues.....	213.00
	<hr/>
Total	\$503.02
Expenditures	301.65
	<hr/>
Balance	\$201.37

The report was accepted as read.

The secretary then read the Longley letter, regarding the emblem for the A. V. M. A. After considerable discussion, it was moved that the secretary be instructed to notify the committee that the association recommends the blue cross with white background for first choice, and a blue star with white background for second choice.

Dr. Cahill, for the Salmon Memorial Committee, reported that he had sent out notices to every member of the association with the current notice, and asked the association to finance sending the appeal to all registered veterinarians in the state who are not members of the association. Moved and carried that the association finance this appeal. Dr. Winchester spoke regarding the Salmon Memorial Fund, and his remarks were followed by a motion by Dr. Cahill that the chair appoint Dr. Winchester a committee of one to appeal to all present for a contribution. The motion was carried. Several contributions were received during the evening by Dr. Winchester.

Dr. Winchester spoke on the Army Veterinary Bill, which had passed the House and Senate. The secretary read Senator Lodge's speech in Congress. Moved by Dr. Harry Peirce, that a committee of three be appointed to draw up a suitable letter expressing the gratitude of this association to Senator Lodge for his efforts. Dr. Cahill remarked that while we owed considerable to Senator Lodge, it should not be forgotten that the moving spirit and the hard worker of the entire affair was Dr. Hoskins, and that the greater credit should be given him. He moved that the same committee frame a suitable letter to be sent to Dr. Hoskins. Unanimously carried.

For the Directory Committee, each member of the committee presented a report, which included both the majority and the minority report. After considerable discussion, the majority report was accepted, and the committee instructed to proceed with the directory.

The secretary reported that he had sent flowers to Dr. Abele, while sick, as directed, and that he had also sent flowers after Dr. Abele's death, and also a floral offering at the request of the treasurer of the A. V. M. A. for that association. He then read a letter of thanks from Mrs. Abele. The association voted to reimburse the secretary for these flowers.

Moved and carried that a committee of three be appointed to draw up resolutions on Dr. Abele's death. Drs. John Robinson, Harrie Pierce, and H. D. Clark, appointed. The chair appointed the following committee to write Senator Lodge and Dr. Hoskins:— Drs. Lester Howard, Samuel Emerson, and John Winchester.

Dr. Winchester read resolutions presented to Congress calling for investigation of dairies, and creating dairy inspection and supervision of milk and dairies to be nation wide in character.

The applications of Dr. Thomas Doyle of Natick, and Dr. Pell Wallingford of Waltham, were read and laid on the table for one month.

The nominating committee reported the following nominations: For president, Dr. Harrie Peirce; first vice-president, Dr. W. H. Dodge; second vice-president, Dr. W. M. Simpson; secretary treasurer, Dr. Edward A. Cahill. The nominees were then unanimously elected.

Following the meeting, about seventy members and friends partook of an exceptionally good seven course banquet. This was followed by the chief speaker of the evening, Dr. Adolph Eichhorn of Washington, D. C., who spoke on "Biological Therapeutics." His paper was one of the best ever presented to this association, and was most closely followed by all present, causing considerable discussion.

Dr. Milton Perry of Framingham gave a most interesting description of his experiences in conveying horses to the allied armies. Short talks were also enjoyed by the members from Senator John B. Hull of Gt. Barrington, Representatives Dr. J. H. McAllister of Lee, George D. Chamberlain, and Arthur E. Marsh of Springfield.

Before adjourning a silent toast was drunk to Drs. Francis Abele, Jr., and Madison Bunker, who departed during the year.

EDWARD A. CAHILL, Secretary.

COMMUNICATIONS

Editor of the Journal of the American Veterinary Medical Association, Ithaca, N. Y. Dear Sir:

In the May issue of the *A. V. M. A. Journal*, is an article by F. M. Perry, Framingham, Mass., concerning the official authority of veterinarians on board steamships transporting horses and mules "to Europe," for war purposes. I feel duty bound to advise that all ships and transportation companies are nothing like Mr. Perry's description of the one he was on.

I have sailed out of New Orleans with something like a hundred men under me, and what I said concerning mules "and their care," went.

The head foreman under me, "did not have any authority over me," or the assistant foreman and muleteers, other than to carry out my orders. I had entire control over water, "feeding," treatment, etc., etc. I did not have any trouble whatever in getting all of my money. The officials on land and sea were all that one could wish for. They were mighty obliging to me in London, and in fact, wherever I found officers. Concerning medicines, I was sent aboard the ship "before loading," where I took an inventory of the drugs and supplies on board; then I filled out my want list of everything I wished, namely, fluid extracts, H. P. tablets, tinctures, antitoxins, etc., etc., and I had medicine to "burn." Of course I had a fine ship, and new, owned by a good company, but I felt that it was my duty to inform the profession that every veterinarian's experience is not disappointing. I consider the work very pleasant, and the pay is ample in my judgment.

Trusting this may scatter some of the clouds, I beg to remain,

Very Respectfully, F. L. PARSE, V.M.D.,
Columbia, Miss.

TO ORGANIZATIONS INTERESTED IN OUR FOOD SUPPLY:

In a brief but serious preliminary hearing on my resolution (House Res. 137) before the Committees on Rules, calling for an investigation of conditions in the collection, manufacture and distribution of dairy products in interstate commerce, some of the testimony showing the absolute necessity of this investigation was as follows:

Dr. A. D. Melvin, Chief of the Bureau of Animal Industry, Department of Agriculture: In answer to the question, "Is a large percentage of the dairy products that are consumed by the American people unfit for food, or not?" Answered: "We think so."

Dr. Melvin also said when asked if the proposed investigation is necessary, "Yes, I think an investigation would be very helpful."

Dr. E. C. Schroeder, Scientist of the Bureau of Animal Indus-

try, said, one dairy cow in ten has tuberculosis and is capable of transmitting that disease to children. That thousands of children under sixteen years contract bovine tuberculosis through eating butter and milk, contaminated with bovine tubercular bacilli. That his and many other investigations show that in every year 6,000 children under five years die of bovine tuberculosis.

Dr. John R. Mohler, Scientist of the Bureau of Animal Industry, said he had personally examined the bodies of nine children who died of tuberculosis and found that two of them died from the bovine form of the disease. That a very large per cent of bone diseases in young children is bovine tuberculosis.

Dr. Mohler also said that bovine tubercular bacilli remain alive and virulent in butter for at least six months, while in cheese the bacilli were alive at the end of 281 days.

Mr. William T. Creasy, Secretary of the National Dairy Union, says the Union favors the proposed investigation, but the organization he represents and other similar organizations are fighting my resolution at every step.

I feel we should know whether or not the terrible charges made by the government's scientists are true.

Shall we stand idly by while every year 6,000 babies die from a preventable cause and many more thousands suffer untold torture?

If you agree with me on this proposition will you please write at once to your Congressman, in care of the House of Representatives, Washington, D. C., expressing your views and asking him to favor this resolution which means so much to every man, woman and child in the United States?

J. CHAS. LINTHICUM.

At a meeting of the National Records Society held in Washington, D. C. in May, a resolution was passed urging the Secretary of Agriculture to partition the present work of the Bureau of Animal Industry among three separate bureaus or offices; one concerned specifically and exclusively with animal diseases to be called the Bureau of Animal Health; one concerned with the encouragement of breeds of live stock and the improvement of the utility stock on the farm other than dairy cattle, and one concerned specifically with the dairy cattle and dairy industry. It is recommended that the heads of these bureaus form a Federal Live Stock Board to administer all live stock regulations under the direction of the Secretary of Agriculture. It is also urged that another assistant secretary of agriculture be appointed to whom the heads of these three bureaus shall be responsible.—From *The Breeder's Gazette*.

REVIEWS

VETERINARY HANDBOOK AND VISITING LIST

THOMAS B. ROGERS, D.V.S.

12 mo.—\$1.50 net.

J. B. Lippincott Company, Publishers, Philadelphia, Pa.

As the title indicates, the book is intended for constant use, and is therefore of convenient size for the outside coat pocket. Reference is made in the 119 pages of text to bacterial therapy; classification of the bacteriological products used in veterinary medicine; the approximate incubative period of the more common infectious animal diseases; prescription writing; Latin phrases; strength of U. S. P. tinctures; poisons and their antidotes; duration of pregnancy in domesticated animals; apothecaries and metric systems of weights and measures; Centigrade and Fahrenheit scales and the Harrison anti-narcotic law.

The major portion of the book is devoted to prescription writing and dose tables for the different classes of animals treated by the veterinarian. Sheep, calves and foals are classed under the same system of doses as to amount. The pigs, classed separately, receives the same doses in the great majority of instances, but with some drugs receives smaller amounts. For the cat the minimum doses for the dog are recommended, as the rule. The dosage is given in both the apothecary and the metric systems. At the end of the book are a number of annotated pages for the records of visits or charges to clients.

The author claims no originality for the subject matter. His work as a practitioner, teacher and member of a state board of veterinary medical examiners, has emphasized in his mind the desirability of such a book. With this there will be many to agree. The mind cannot retain indefinitely the many details of dosage and therapeutic facts. As a book of ready reference the work fills this need and should be of much benefit to the practitioner.

P. A. F.

NECROLOGY

DR. W. C. HOLDEN

Dr. W. C. Holden of Delphos, Ohio, a member of the American Veterinary Medical Association, died at his home, April 16, 1916. Dr. Holden had been a patient sufferer for many months with liver trouble and diabetes.



E. S. RICE

Dr. E. S. Rice, the oldest practicing veterinarian in Arkansas, died April 24th at Little Rock, at the age of 77 years. During the past 47 years he was an active practicing veterinarian in the vicinity of Little Rock. Dr. Rice was born in Watton, England. He received his veterinary training at the Royal Veterinary College, London. He was always active in the upbuilding of veterinary practice in the state and for the past ten years has worked hard in trying to procure the passage of the veterinary practice act. In 1915 he was the father of the Arkansas Veterinary Practice Act which passed during the 1915 session of the legislature. He was also a charter member of the Arkansas Humane Society.



HARRY W. RIKE

Dr. Harry W. Rike of 735 Linden Ave., Burlingame, California, died April 6, 1916. He was a graduate of the Ontario Veterinary College in the class of 1889, and joined the American Veterinary Medical Association in 1909.

MISCELLANEOUS

VETERINARY CONDITIONS IN THE WAR ZONE. Dr. C. J. Marshall, who was sent abroad by the University of Pennsylvania, left America March 11, 1916 on the Rotterdam for England and France to make observations on the care and treatment of horses in war. He obtained permission from the War Department of each country to inspect the veterinary hospitals and remount stations in the two armies. The veterinary service is remarkably well organized. Many of the best veterinarians in both countries are engaged in this work. The army veterinarians are all highly educated. They have at least a high school preliminary education with a four years' course in a veterinary college. After this preparation they are given a cavalry training. They are given rank as high as Major General.

The veterinary hospitals are equipped with an abundance of help, forage, medicine, instruments and everything required to give horses the best care and treatment. At the beginning of hostilities conditions were not favorable. Many difficulties and discouraging features have been overcome. There have never before been such facilities and organization available or so much consideration and recognition given the army veterinary service as in the present war. The results are among the highest accomplishments of the veterinary profession.

The horrible suffering reported among army horses is entirely unfounded. There is nothing pleasant about war but horses as a rule are as considerately and kindly treated as the men are. The average life of an army horse has been reported as five days. In the two armies visited many horses were seen that had been in service since hostilities began and the horses as a rule looked as well as the average contractor's horses in America.

Returning, he sailed from Bordeaux on the S. S. Touraine for New York and arrived on May 9th with the highest praise for the good work that is being done in caring for disabled horses by the English Army Veterinary Corps, the Royal Society for the Prevention of Cruelty to Animals and the Blue Cross.

Dr. W. P. Hill from the Sixth Cavalry, who is representing the U. S. War Department, is in Paris. He left America early in January and is planning to remain in France till the end of the war. He should obtain valuable information in reference to the organization

of the veterinary service which will be of special interest in reorganizing this service in our army. The organization of the work is of much importance at present from the fact that rank and recognition is about to be given our army veterinary service.

Civil service examinations will be held in California the third week in June to provide an eligible list from which to appoint assistants to the state veterinarian. Several appointments at \$1500 a year are to be made on October 1, 1916. The examination is open to residents of California who are graduates of recognized veterinary colleges. Further particulars concerning the examination may be obtained from the State Civil Service Commission, Sacramento, Calif.

COMPULSORY TUBERCULIN TESTING AND PASTEURIZATION IN CALIFORNIA. On October 1st, an act of the California legislature became effective, the enforcement of which is of particular interest to the veterinary profession.

This law provides for the compulsory testing of all cows in this state from which milk or cream is sold at retail in a raw or unpasteurized condition. All milk or cream which is the product of cows which have not passed the tuberculin test must be pasteurized by the holding process before it is sold or made into butter.

In addition, all milk sold under the jurisdiction of a city or county milk inspection service must be graded into five classes.

Dairymen who sell in bulk to the wholesale trade need not have their cows tested. This includes all who sell exclusively to creameries. In this case, the responsibility for pasteurization rests with the creamery or the retailer.

The fifteenth annual meeting of the North Dakota Veterinary Association will be held at the Veterinary Building, Agricultural College, Fargo, N. D., three days, during the State Fair, July 18, 19, 20.

The U. S. Department of Agriculture publishes a booklet containing the abstracts of the veterinary law of each of the states with the titles and addresses of those in charge of the enforcement of such laws. The booklet is complete and kept up to date. Copies may be obtained by those interested in the interstate shipment of animals.

Dr. C. H. Stange of Ames, Iowa, is convalescing at Excelsior Springs, Missouri.

At the last meeting of the Tennessee Veterinary Medical Association at Chattanooga, the following officers were elected: J. H. McMahon, president; E. M. Cully, first vice-president, G. P. Whittington, second vice-president; F. W. Morgan, secretary; W. L. Coplin, treasurer. There was a good attendance and a fine clinic. The next meeting will be held at Humboldt, November 8th.

Dr. R. M. Bell is assisting Dr. W. G. Hollingworth at Utica, N. Y., in his practice.

The Alumni Association of the United States College of Veterinary Surgeons held their annual meeting at the Raleigh Hotel, Washington, D. C., on Friday evening, April 14th. Seventy-five members were present. During the business meeting the following were elected to office: H. S. Gamble, '08, president; C. F. Miller, '16, vice-president; C. M. Mansfield, '07, secretary-treasurer. A social program followed which consisted of music and talks. A buffet luncheon was served. The next meeting will be held Saturday evening, April 14, 1917, at Washington, D. C.

The joint meeting of the California State Veterinary Medical Association and the Southern Auxiliary California State Veterinary Medical Association will be held in Los Angeles June 21 and 22.

Dr. C. J. Marshall, after a two months absence visiting European veterinary camps, has returned to Philadelphia. Dr. Marshall's observations will be incorporated in a comprehensive report to be submitted to the trustees of the University of Pennsylvania.

—Public Ledger.

Dr. Liantard writes us that he had the pleasure of a visit from Drs. Marshall and Hill while they were abroad on their official mission.

In an article on "What to Do to Protect our Live Stock," in *Hoard's Dairyman*, Dr. M. H. Reynolds of Minnesota, gives as a part of his live stock sanitary control creed that: "State control work should be in charge of a small non-partisan board of reasonably stable membership. Said board should consist of stockmen and veterinarians. Legal provision should be made that the executive official must be a veterinarian.

"The law should provide that anybody who knows of or suspects the existence of any communicable disease must report to the state under penalty."

The midsummer meeting of the Minnesota State Veterinary Medical Association, will be held in Minneapolis, July 12 and 13.

